

**CWM CHEMICAL SERVICES, INC.**

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**CHICAGO INCINERATOR FACILITY**  
CHICAGO, ILLINOIS

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**FINAL  
RCRA FACILITY INVESTIGATION  
REPORT**

**APPENDICES N - P**

**PART 1 OF  
VOLUME 3 OF 5  
FEBRUARY 1995**

**CWM CHEMICAL SERVICES, INC.**  
**CHICAGO INCINERATOR FACILITY**  
**FINAL RCRA FACILITY INVESTIGATION REPORT**  
**February 1995**

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**APPENDIX N**  
**DATA VALIDATION REPORTS**





**PHASE I**  
**DATA VALIDATION REPORTS**

**- APPENDIX N -**  
**DATA VALIDATION REPORTS**

**DATA VALIDATION/QUALITY ASSURANCE REVIEW  
PHASE I RCRA FACILITY INVESTIGATION  
CHEM-WASTE MANAGEMENT, INC. - CHICAGO INCINERATOR SITE  
SAMPLE COLLECTION DATES: SEPTEMBER 19 THROUGH 21, 1989  
DAMES & MOORE JOB NO.: 13963-055-192**

**LABORATORY REPORT NO.: 350195, 350196, 350197 & 350198**

**INTRODUCTION**

A total of twenty (20) soil samples, plus two (2) field-duplicate soil samples were collected and submitted to Environmental Testing and Certification (ETC) of Edison, New Jersey (1992 Illinois Certification No. 100224). The samples included in the review are listed on Table 1. All twenty two (22) samples were analyzed for Priority Pollutant Volatile Organic Compounds (VOA), Semivolatile Organic Compounds (BNA), Organochlorine Pesticides and Polychlorinated Biphenyls (PCBs), metals, total cyanide (CN) and total phenol. All samples were analyzed following USEPA SW-846 Methodologies.

Data were examined to assess the usability of the results. The organic data quality review is based upon a rigorous review of the reported hold times, surrogate recovery results, blank spike recoveries, matrix spike and matrix spike duplicate analyses, blank contaminants, internal standard area performance, Gas Chromatography/Mass Spectroscopy (GC/MS) tuning and calibration data.

The inorganic and conventional parameter findings offered in this report are based upon review of the reported hold times, blank analysis results, blank spike recoveries, matrix spike recoveries, duplicate results, instrument calibration verification, post-digestion spike recoveries and Inductively Coupled Plasma (ICP) serial dilution analyses.

The analytical data was presented in an ETC Abbreviated Data Format as requested by Chemical Waste Management, Inc. The laboratory retrieved the archived support documentation for the data validation review; however, not all support documentation was retrievable by the laboratory. Therefore, a quality assurance review rather than data validation is provided for select data points. The quality assurance reviews are not as rigorous as quantitative data validation and for these data, the

quality assurance review assumes the analytical results are correct as reported and merely provides an interpretation of the reported quality control results.

Details of the data validation/quality assurance review are presented in the narrative section of the report. The data is summarized in Table 2 of the report. Data qualifiers have been placed next to the results so that the data user can quickly assess the qualitative and/or quantitative reliability of the reported result. This report was prepared to provide a critical review of the laboratory analysis and reported chemical results. Quality assurance reviews of laboratory-generated data routinely identify problems associated with analytical measurements, even from the most experienced and capable laboratories.

This review has been performed in accordance with the requirements specified in the "Laboratory Data Validation Functional Guidelines for Evaluating Organic Analyses" dated February 1988 and "Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses" dated July 1988.

**TABLE 1**  
**SAMPLES INCLUDED IN REVIEW**

<u>Sample ID</u>	<u>Lab ID</u>	<u>Collection Date</u>	<u>Analyses Requested*</u>
<u>Laboratory Log Link No. 350195</u>			
SB315F2	HA1172	9/19/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
SB315F1	HA1173	9/19/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
<u>Laboratory Log Link No. 350196</u>			
SG307F1	HA1144	9/20/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
SB306F2	HA1158	9/20/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
SB306F1	HA1159	9/20/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
SG307F2	HA1164	9/20/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
SG307F2-Dup	HA1178	9/20/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
SP323F1	HA1179	9/20/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
<u>Laboratory Log Link No. 350197</u>			
SB313F1	HA1150	9/21/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
SB313F2	HA1151	9/21/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
SG314F1	HA1152	9/21/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
SG314F2	HA1153	9/21/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
SP323F2-Dup	HA1154	9/21/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
SP323F2	HA1155	9/21/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols

Laboratory Log Link No. 350198

SG305F1	HA1156	9/22/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
SG305F2	HA1157	9/22/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
SG332F1	HA1160	9/21/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
SG332F2	HA1161	9/21/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
SB331F1	HA1168	9/21/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
SB331F2	HA1169	9/21/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
SP322F1	HA1170	9/21/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
SP322F2	HA1171	9/21/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols

Legend:

PP VOA	=	Priority Pollutant Volatile Organic Compounds
PP BNA	=	Priority Pollutant Semi-volatile Organic Compounds (Base/Neutral/Acid Extractable Compounds)
PP Pest/PCB	=	Priority Pollutant Organochlorine Pesticides and Polychlorinated Biphenyls
PP Metals	=	Priority Pollutant Inorganic Parameters
CN	=	Total Cyanide
Phenols	=	Total Phenol

**DATA QUALIFIERS**

The data validation review has identified aspects of the analytical data that require qualification. To confidently use any of the data within the data set, the data user should understand the limitations and qualifications presented. With regard to data usability, the following qualifiers are offered based upon the data provided.

**ORGANIC QUALIFIERS**

**Hold Times:**

- Sample SG307F2-Dup (Log Link 350196) was analyzed for volatile organic compounds 25 days outside the recommended hold time. Due to the excessive hold time violation sample SG307F2 would typically be rejected as unreliable. However, the analytical results for the field duplicates replicated well, indicating that the hold time exceedence has not significantly impacted data quality; therefore, no qualifier has been applied.
- Samples SB314F2, SG314F1 and SG313F1 (Log Link 350197) were analyzed for volatile organic compounds 1 to 2 days outside the recommended hold time. There is no impact on data usability and no qualifier has been applied.

- Samples SB313F2 and SP323F2-Dup (Log Link 350197) were analyzed for volatile organic compounds 7 days outside the recommended hold time. The positive and non-detected results may be biased low and have been flagged (J/UJ) estimate on Table 2.
- Samples SG305F2, SG332F1, SG332F2 SB331F1 and SB331F2 (Log Link 350198) were analyzed for volatile organic compounds 1 to 4 days outside the recommended hold time. There is no impact on data usability and no qualifier has been applied.

#### Blank Contamination:

- Due to the trace presence of the following volatile organic compounds (VOAs) in the associated laboratory and/or field blank samples, positive results of the following compounds in the field samples are qualitatively questionable and have been flagged (B) on Table 2 of this report.

<u>Analyte</u>	<u>Associated Samples</u>
Methylene chloride	SB315F2, SB315F1, SB306F2, SB313F1, SG314F1, SG314-F2, SP323F2DUP, All samples in Log Link (LL) 30198 except SP322F1 and SP322F2
Benzene	SB315F2, SB315F1
Chloroform	All samples in LL-350196
Toluene	All samples in LL-350196

- Due to the trace presence of the following semi-volatile organic compounds (VOAs) in the associated laboratory and/or field blank samples, positive results of the following compounds in the field samples are qualitatively questionable and have been flagged (B) on Table 2. Positive concentrations which are greater than five times the blank concentrations ( ten times for phthalates) are regarded as "real" values and no qualifier is applied.

<u>Analyte</u>	<u>Associated Samples</u>
Bis(2-Ethylhexyl)phthalate & di-n-Butyl phthalate	All field Samples in LL 350195, 350196, 350197 and 350198
Di-n-octyl phthalate	All field Samples in LL 350195, 350196 and 350197 except SP322F1



#### Surrogate Recoveries:

- The volatile surrogate compound, 1,4-dichloroethane-d4, fell outside control limits (high) for sample SP322F2. Positive results may be biased high and have been flagged (J) estimated on Table 2. There is no impact on the non-detected results and no qualifier is applied.
- The semi-volatile surrogate compound, terphenyl-d14, fell outside control limits (high) for all samples in Log Link 350195, 350196, 350197 and 350198. Positive base/neutral results may be biased high; however, no qualifier is required since only one surrogate fell outside control limits.
- The semi-volatile surrogate compound, 2-fluorophenol, fell outside control limits (high) for sample SB331F1. Positive acid extractable results may be biased high; however, no qualifier is required since only one surrogate fell outside control limits.
- The pesticide surrogate compounds, tetra-chloromethyl-xylene (TCMX) and dibutylchlorendate (DBC), fell outside control limits (high) for samples SB315F1 (LL 350195), SG314F1, SP323F2 (LL 350197) and SG331F1, SB331F2, SB332F1, SB332F2 (LL 350198). Positive results may be biased high, however, there is no impact on the non-detected results and no qualifier has been applied.
- The pesticide surrogate compounds, TCMX and DBC, fell outside control limits (low) for samples SB306F2, SB307F2 (LL 350196), and SP323F2-Dup (LL 350197). The reported method detection limits may be higher than reported and have been flagged (UJ) on Table 2.

#### Internal Standard Area Performance:

- The area count of the volatile internal standards, difluorobenzene and chlorobenzene-d5, associated with samples SB315F1, SB315F2 (LL 350195), SP323F1 (LL 350196), SB313F2, SP323F2-Dup (LL 350197) and SG305F2, SG332F1, SP322F1 and SP322F2 (LL 350198) were reported outside the control limits (low). The positive and non-detected compounds quantitated against these internal standards for these samples may be biased low and have been flagged (J/UJ) estimated on Table 2.
- The area count of all three volatile internal standards associated with sample SG307F2, (Log link 350196) were reported outside the control limits (low). The positive and non-detected compounds quantitated against these internal standards for this sample may be biased low and have been flagged (J/UJ) estimated on Table 2.

#### Matrix Spikes (MS) and Matrix Spike Duplicate (MSD) Results:

- Field duplicate samples SG307F2 and SG307F2-Dup (LL 350196) and SP323F2 and SP323F2Dup (LL 350197) were collected and submitted to the laboratory. Overall, the reproducibility of the organic results are good, providing a positive indication of the field techniques and laboratory precision associated with these samples. In the volatile analysis of duplicate samples P3232, the 1,1,1-trichloroethane results did not replicate (16.3 and 117 ug/kg respectively). The high variability in these results may be due to a lack of sample homogeneity. The positive 1,1,2-trichloroethane results in the duplicate samples are regarded as estimated and have been flagged (J) on Table 2.
- The base/neutral extractable compound, bis(2-chloroisopropyl)ether exhibited a poor (0%) recovery for the blank spike as well as the matrix spike/matrix spike duplicate. The not detected results for all field samples are regarded as unreliable (compound may or may not be present) and have been flagged(R) on Table 2.

#### Initial and Continuing Calibration Results:

- Due to the high difference between the initial and continuing calibration response factors (%D >35% and <90%), all positive results for the following volatile compounds have been flagged (J) estimated. The actual detection limit may be higher than reported and has been flagged (UJ) estimated in Table 2 of this report.

<u>Analyte</u>	<u>Log Link</u>	<u>Associated Sample</u>
Dichlorodifluoromethane,	350197	SB313F1, SG314F1
Trichlorofluoroethane,	350198	SG305F2, SG332F1, SG332F2, SB331F1
1,1,1-Trichloroethane & trans-1,3-Dichloropropene		
Methylene chloride	350195	SG307F1
	350196	SB306F1, SB306F2, SG307F2, SP323F1
	350197	SP323F2, SB313F2, SP323F2-Dup

- Due to the extremely high difference between the initial and continuing calibration response factors (%D >90%), all positive results for the following volatile compounds have been flagged (J) estimated. The actual detection limit is unreliable (compound may or may not be present) and has been flagged (R) on Table 2.

<u>Analyte</u>	<u>Log Link</u>	<u>Associated Sample</u>
Chloroethane	350195	SG307F1
	350196	SB306F1, SB306F2, SG307F2, SP323F1, SG307F2, SG307F2-Dup,
	350197	SP323F2
Methylene chloride	350197	SB313F1, SG314F1
	350198	SG305F2, SG332F1, SG332F1, SG332F2

- Due to the high difference between the initial and continuing calibration response factors, all positive results for the following semi-volatile compounds have been flagged (J) estimated. The actual detection limit may be higher than reported and has been flagged (UJ) estimated in Table 2 of this report.

<u>Analyte</u>	<u>Log Link</u>	<u>Associated Sample</u>
Hexachlorocyclopentadiene	350195	All field samples
	350196	All field samples
	350197	All field samples
	350198	All field samples

- For the pesticide/PCB analyses, the correlation coefficient of the initial calibrations fell within acceptable control limits ( $>0.995$ ).
- For the pesticide/PCB analyses, the analytical sequence requirements were met. However, since the standard chromatograms were not available for review (quantitation reports only), no comments can be offered regarding an evaluation of the system performance to ensure adequate resolution.
- The DDT/Endrin breakdown was evaluated and fell within acceptable control limits on the primary column analysis. The combined DDT/Endrin breakdown was greater than 30% on the confirmatory column. There is no impact on data quality, however, since no samples were positive for either DDT, Endrin or their breakdown products.

#### Additional Comments:

- As per the requirements, all values calculated below the method detection limit should be considered estimated and have been flagged (J) in Table 2 of this report.

## INORGANIC and CONVENTIONAL PARAMETER QUALIFIERS

### General Comments:

- With regard to the data package deliverables, most of the requirements were met with the exception of the metals fraction. This reviewer has observed that for the ICP concentrations reported at 10 to 15 times above the method detection limit (MDL), the data validation cannot reproduce the laboratory reported results. The calculation obtained during data validation is consistently higher than the laboratory reported concentration. This is due to the fact that the interelement correction factors in the ICP instrument have been externally calculated. Since this external interelement correction factor is not available for review, the reported results for low level samples cannot be reproduced. It should be noted that positive ICP reported results that are significantly above than the MDL were reproduced and validated, since this interelement correction factor becomes negligible at higher concentrations. The data review assumes that the low level reported concentrations are correct as reported and it is this reviewer's opinion that data usability is not impacted.

### Hold Times:

- All samples were digested and analyzed within the required hold time criteria for metals and cyanide. The preparation and analysis date of the total phenols was not available for review; however, based upon the date of report, it appears that the hold time criteria was met for the total phenols analyses as well.

### Blank Contamination:

- No blank contaminants have been identified that require qualification on the metals or cyanide for the samples included in log links (LL) 350195, 350196 and 350197.
- Trace concentrations of chromium and zinc were identified in the laboratory preparation blank associated with the samples in LL 930198 at concentrations below the reported method detection limit (BMDL). No qualifiers have been applied to the field samples since the chromium and zinc concentrations in all samples were above the method detection limit and are therefore regarded as "real" values.

#### Inductively Coupled Plasma (ICP) Serial Dilution Results:

- The ICP serial dilution analyses of zinc associated with sample SG307F1 was greater than 10% difference. The positive zinc result in this sample is regarded as an estimated value and has been flagged (J) on Table 2.

#### Matrix Spike (MS) and Duplicate (DU) Summary Results:

- The matrix spike recovery of antimony was outside control limits (low) for MS sample SG307F1. The positive antimony results in the unspiked sample may be biased low and have been flagged (J) estimated on Table 2.
- The matrix spike compound antimony was not recovered (0%) for MS sample SP329F1. The non-detected antimony result in the unspiked sample is unreliable (compound may or may not be present) and has been flagged (R) on Table 2.
- The matrix spike recovery of cadmium, copper and selenium were outside control limits (low) for MS sample SP329F1. The positive and non-detected results of these analytes in the unspiked sample may be biased low and have been flagged (J/UJ) estimated on Table 2.
- Field duplicate samples SG307F2 and SG307F2Dup (LL 350196) and SP323F2 and SP323F2Dup (LL 350197) were collected and submitted to the laboratory. Overall, the reproducibility of the metal and cyanide results are good, providing a positive indication of the field techniques and laboratory precision associated with these samples.

#### Post-Digestion Spike Recoveries:

- The post-digestion spike recoveries of the following analytes were outside the control limits (low). Positive and/or non-detected results of these analytes for the associated samples may be biased low and have been flagged (J/UJ) estimated.

<u>Analyte</u>	<u>Log Link</u>	<u>Associated Samples</u>
Selenium	350196	SB306F1, SB306F2, SG307F2, SG307F2-Dup, SB315F2, SB323F1
	350197	SB313F2, SB314F1, SB314F2, SB323F2-Dup, SP323F2, SB313F1
	350198	All samples in data set
Thallium	350198	SP329F2-Dup

- The post-spike recoveries of the following analytes were recovered outside the control limits (high). Positive results of these analytes for the associated samples may be biased high and have been flagged (J) estimated in Table 2 of this report.

<u>Analyte</u>	<u>Log Link</u>	<u>Associated Sample</u>
Thallium	350197	SP323F2-Dup

Additional Comments:

- The laboratory reports several inorganic results as below the method detection limit (BMDL). These are reported as BMDL on Table 2. The actual concentrations are not calculated during the data validation review since the interelement coefficient factors were not provided.



TABLE 2  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number Laboratory Sample Number Sampling Date Dilution Factor Units	Quant Limit ug/L	Quant Limit ug/Kg	G305F1 HA1156 09/22/93 50 ug/Kg	G305F2 HA1157 09/22/93 5 ug/Kg	B306F1 HA1159 09/20/93 100 ug/Kg	B306F2 HA1158 09/20/93 50 ug/Kg	G307F1 HA1144 09/20/93 1 ug/Kg	G307F2 HA1164 09/20/93 1 ug/Kg	G307F2DUP HA1178 09/20/93 1 ug/Kg	B313F1 HA1150 09/21/93 1 ug/Kg	B313F2 HA1151 09/21/93 1 ug/Kg	G314F1 HA1152 09/21/93 1 ug/Kg	G314F2 HA1153 09/21/89 10 ug/Kg
PRIORITY POLLUTANT P/T VOLATILE COMPOUNDS													
Benzene	4.4	4.4	45.8 J	UJ	315 J	125 J	1.86 J	UJ	U	16	6.0 J	16	81.5
Bromoform	4.7	4.7	U	UJ	U	U	U	UJ	U	U	UJ	U	U
Carbon Tetrachloride	2.8	2.8	U	UJ	U	U	U	UJ	U	UJ	UJ	UJ	U
Chlorobenzene	6.0	6.0	U	UJ	U	U	U	UJ	UJ	79.5	UJ	U	U
Chlorodibromomethane	3.1	3.1	U	UJ	U	U	U	UJ	U	U	UJ	U	U
Chloroethane	10	10	U	U	R	R	R	R	R	U	U	U	U
Chloroform	1.6	1.6	U	U	144 JB	47 JB	1.46 JB	UJ	U	1.27 J	U	0.74 J	U
Dichlorobromomethane	2.2	2.2	U	U	U	U	U	UJ	U	U	U	U	U
Dichlorodifluoromethane	10	10	U	UJ	U	U	U	UJ	U	UJ	U	UJ	U
1,1-Dichloroethane	4.7	4.7	U	U	U	U	U	UJ	U	1.03 J	2.9 J	U	U
1,2-Dichloroethane	2.8	2.8	U	U	U	U	U	UJ	U	U	U	5.76 J	U
1,1-Dichloroethene	2.8	2.8	U	15.3 J	22500	7820	5.49 J	UJ	U	25.1	144	4.1	280
1,2-Dichloropropane	6.0	6.0	U	UJ	U	U	U	UJ	U	U	UJ	U	U
cis-1,3-Dichloropropene	5.0	5.0	U	UJ	U	U	U	UJ	U	U	UJ	U	U
Ethylbenzene	7.2	7.2	171 J	UJ	U	U	U	UJ	U	15.8	UJ	2.95 J	U
Methyl bromide	10	10	U	U	U	U	U	UJ	U	UJ	U	UJ	U
Methyl chloride	10	10	U	UJ	U	U	U	UJ	UJ	UJ	U	UJ	U
Methylene Chloride	2.8	2.8	478 B	328 B	44500 J	2850 JB	167 J	126 J	97.5	68.8 JB	174 J	30.8 JB	414 B
1,1,2,2-Tetrachloroethane	4.1	4.1	U	UJ	U	U	UJ	UJ	U	U	UJ	U	U
Tetrachloroethene	4.1	4.1	U	UJ	U	U	UJ	UJ	UJ	13.5	UJ	U	U
Toluene	6.0	6.0	399	UJ	245 JB	142 JB	5.32 J	28.2 J	1.76 J	49	3.8 J	7.4	24.5 J
1,2-Dichloroethene (trans)	1.6	1.6	171	UJ	238	54 J	U	UJ	U	142 J	1.4 J	1.01 J	U
1,1,1-Trichloroethane	3.8	3.8	U	UJ	U	49 J	U	UJ	U	UJ	UJ	UJ	U
1,1,2-Trichloroethane	5.0	5.0	U	21 J	176 JB	110 JB	17.2	6.68	10.3	23.6	UJ	21.4	384
Trichloroethene	1.9	1.9	U	UJ	305	90 J	U	UJ	U	6.34 J	UJ	U	U
Trichlorofluoromethane	10	10	U	8.8 J	U	U	U	BMDL J	1.52 J	UJ	U	UJ	U
Vinyl Chloride	10	10	U	U	U	U	U	UJ	U	U	66.8	16.2 J	75.9 J
trans-1,3-Dichloropropene	10	10	U	UJ	U	U	U	UJ	U	UJ	UJ	UJ	U

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number			G305F1	G305F2	B306F1	B306F2	G307F1	G307F2	G307F2DUP	B313F1	B313F2	G314F1	G314F2
Laboratory Sample Number			HA1156	HA1157	HA1159	HA1158	HA1144	HA1164	HA1178	HA1150	HA1151	HA1152	HA1153
Sampling Date	Quant	Quant	09/22/93	09/22/93	09/20/93	09/20/93	09/20/93	09/20/93	09/20/93	09/21/93	09/21/93	09/21/93	09/21/89
Dilution Factor	Limit	Limit	2.94	2.41	2.41	3.5	2.32	2.0	2.2	2.65	1.97	1.47	2.1
Units	ug/L	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
PRIORITY POLLUTANT ACID EXTRACTABLE COMPOUNDS													
2-Chlorophenol	3.9	340	U	U	U	U	U	U	U	U	U	U	U
2,4-Dichlorophenol	3.2	280	U	U	9790	906 J	U	U	U	1120	490 J	837	1610
2,4-Dimethylphenol	3.2	280	U	U	U	U	U	U	U	U	U	U	U
4,6-Dinitro-2-methylphenol	29	2400	U	U	U	U	U	U	U	U	U	U	U
2,4-Dinitrophenol	50	4300	U	U	U	U	U	U	U	U	U	U	U
2-Nitrophenol	4.3	370	U	U	U	U	U	U	U	U	U	U	U
4-Nitrophenol	2.9	240	U	U	U	U	U	U	U	U	U	U	U
4-Chloro-3-methylphenol	3.6	310	U	U	U	U	U	U	U	U	U	U	U
Pentachlorophenol	4.3	370	U	U	U	U	U	U	U	U	U	U	U
Phenol	1.8	150	U	U	6050	U	U	U	U	U	U	U	U
2,4,6-Trichlorophenol	3.2	280	U	U	U	U	U	U	U	U	U	U	U

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number	Quant	Quant	G305F1	G305F2	B306F1	B306F2	G307F1	G307F2	G307F2DUP	B313F1	B313F2	G314F1	G314F2
Laboratory Sample Number	Limit	Limit	HA1156	HA1157	HA1159	HA1158	HA1144	HA1164	HA1178	HA1150	HA1151	HA1152	HA1153
Sampling Date	ug/L	ug/Kg	09/22/93	09/22/93	09/20/93	09/20/93	09/20/93	09/20/93	09/20/93	09/21/93	09/21/93	09/21/93	09/21/89
Dilution Factor	2.94	2.41	2.41	2.41	2.41	3.5	2.32	2.0	2.2	2.65	1.97	1.47	2.1
Units	ug/L	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
PRIORITY POLLUTANT BASE/NEUTRAL EXTRACTABLE COMPOUNDS													
Acenaphthene	2.3	220	U	U	U	U	U	U	U	591	U	396	BMDL
Acenaphthylene	4.2	410	U	U	U	U	U	U	U	U	U	U	U
Anthracene	2.3	220	310 J	U	U	U	U	U	U	5610	BMDL	755	504
Benzo(a)anthracene	9.3	910	BMDL	U	U	U	U	U	U	2140	BMDL	1790	BMDL
Benzo(a)pyrene	3.0	290	BMDL	U	U	U	U	U	U	2240	BMDL	1650	745
Benzo(b)fluoranthene	5.7	560	BMDL	U	U	U	590 J	U	560 J	3720	BMDL	2710	1190
Benzo(g,h,i)perylene	4.9	480	U	U	U	U	U	U	U	U	U	U	U
Benzo(k)fluoranthene	3.0	290	U	U	U	U	328 J	U	U	417 J	BMDL	BMDL	BMDL
bis(2-Chloroethoxy)methane	6.3	620	U	U	U	U	U	U	U	U	U	U	U
Bis(2-chloroethyl) ether	6.8	660	U	U	U	U	U	U	U	U	U	U	U
bis(2-chloroisopropyl) ether	6.8	660	R	R	R	R	R	R	R	R	R	R	R
bis(2-Ethylhexyl)phthalate	12	1200	BMDL B	1434 J	460 JB	667 JB	3600 B	383 JB	592 JB	26100	1720 JB	2250 B	380 JB
4-Bromophenylphenyl ether	2.3	220	U	U	U	U	U	U	U	U	U	U	U
Butylbenzylphthalate	12	1200	U	U	U	U	U	U	U	U	U	U	U
2-Chloronaphthalene	2.3	220	U	U	U	U	U	U	U	U	U	U	U
4-Chlorophenylphenyl ether	5.0	490	U	U	U	U	U	U	U	U	U	U	U
Chrysene	3.0	290	770	U	U	U	410	U	U	2140	U	U	U
Dibenz(a,h)anthracene	3.0	290	U	U	U	U	U	U	U	U	U	U	U
1,2-Dichlorobenzene	2.3	220	U	U	U	U	U	U	U	490 J	U	U	U
1,3-Dichlorobenzene	2.3	220	U	U	U	U	U	U	U	U	U	U	U
1,4-Dichlorobenzene	5.2	510	U	U	U	U	U	U	U	U	U	U	U
3,3'-Dichlorobenzidine	19.6	1920	U	U	U	U	U	U	U	U	U	U	U
Diethylphthalate	12	1200	U	U	U	U	U	U	U	U	U	U	U
Dimethylphthalate	12	1200	U	U	U	U	U	U	U	U	U	U	U
Di-n-butylphthalate	12	1200	U	3150	4680 B	4640 B	3510 B	4830 B	3900 B	1215 JB	586 JB	878 JB	721 JB
2,4-Dinitrotoluene	6.8	660	U	U	U	U	U	U	U	U	U	U	U
2,6-Dinitrotoluene	2.3	220	U	U	U	U	U	U	U	U	U	U	U
Di-n-octylphthalate	12	1200	U	U	U	936 JB	506 B	U	1100 JB	U	BMDL	3110 B	620 JB
Fluoranthene	2.6	260	1530	U	U	U	830	U	888	4240	937	3610	1800
Fluorene	2.3	220	U	U	U	U	U	U	U	907	BMDL	428	438
Hexachlorobenzene	2.3	220	U	U	U	U	U	U	U	U	U	U	U
Hexachlorobutadiene	1.1	100	U	U	U	U	U	U	U	U	U	U	U
Hexachlorocyclopentadiene	12	1200	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Hexachloroethane	1.9	190	U	U	U	U	U	U	U	U	U	U	U
Indeno(1,2,3-cd)pyrene	4.4	430	U	U	U	U	U	U	U	U	U	U	U
Isophorone	2.6	260	U	U	U	U	U	U	U	U	U	U	U
Naphthalene	1.9	190	U	U	164 J	U	U	U	U	1830	U	503	U
Nitrobenzene	2.3	220	U	U	U	U	U	U	U	U	U	U	U
N-Nitroso-dimethylamine	12	1200	U	U	U	U	U	U	U	U	U	U	U
N-Nitroso-di-n-propylamine	12	1200	U	U	U	U	U	U	U	U	U	U	U
N-Nitroso-diphenylamine	2.3	220	U	U	U	U	U	U	U	U	U	U	U
Phenanthrene	6.4	630	BMDL	U	U	U	U	U	BMDL	5210	1190	3070	2170
Pyrene	2.3	220	1210	U	U	U	837	U	856	3710	886	3020	1610
1,2,4-Trichlorobenzene	2.3	220	U	U	U	U	U	U	U	U	U	U	U

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number Laboratory Sample Number	Quant Limit	Quant Limit	G305F1 HA1156 09/22/93 36 ug/Kg	G305F2 HA1157 09/22/93 3.7 ug/Kg	B306F1 HA1159 09/20/93 2.94 ug/Kg	B306F2 HA1158 09/20/93 112 ug/Kg	G307F1 HA1144 09/20/93 7.1 ug/Kg	G307F2 HA1164 09/20/93 59 ug/Kg	G307F2DUP HA1178 09/20/93 65 ug/Kg	B313F1 HA1150 09/21/93 82 ug/Kg	B313F2 HA1151 09/21/93 2.88 ug/Kg	G314F1 HA1152 09/21/93 224 ug/Kg	G314F2 HA1153 09/21/89 65 ug/Kg
Units	ug/L	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
PESTICIDES													
Aldrin	0.05	1.7	U	U	U	UJ	U	UJ	U	U	U	U	U
Alpha-BHC	0.05	1.7	U	U	U	UJ	U	UJ	U	U	U	U	U
Beta-BHC	0.05	1.7	U	U	U	UJ	U	UJ	U	U	U	U	U
Gamma-BHC (Lindane)	0.05	1.7	U	U	U	UJ	U	UJ	U	U	U	U	U
Delta-BHC	0.05	1.7	U	U	U	UJ	U	UJ	U	U	U	U	U
Chlordane	1.0	33	U	U	U	UJ	U	UJ	U	U	U	U	U
4,4'-DDT	0.10	3.3	U	U	U	UJ	U	UJ	U	U	U	U	U
4,4'-DDE	0.10	3.3	U	U	U	UJ	U	UJ	U	U	U	U	U
4,4'-DDD	2.5	83	U	U	U	UJ	U	UJ	U	U	U	U	U
Dieldrin	0.10	3.3	U	U	U	UJ	U	UJ	U	U	U	U	U
Endosulfan I	0.05	1.7	U	U	U	UJ	U	UJ	U	U	748	U	U
Endosulfan II	0.10	3.3	U	U	U	UJ	U	UJ	U	U	U	U	U
Endosulfan Sulfate	0.10	3.3	U	U	U	UJ	U	UJ	U	U	46.1	U	U
Endrin	0.10	3.3	U	U	U	UJ	U	UJ	U	U	U	U	U
Endrin Aldehyde	0.10	3.3	U	U	U	UJ	U	UJ	U	U	U	U	U
Heptachlor	0.05	1.7	U	U	U	UJ	U	UJ	U	U	13.8	U	U
Heptachlor Epoxide	0.05	1.7	U	U	U	UJ	U	UJ	U	U	U	U	U
Toxaphene	2.0	65	U	U	U	UJ	U	UJ	U	U	U	U	U
Arochlor-1016	0.55	18	U	U	U	UJ	U	UJ	U	U	U	U	U
Arochlor-1221	0.55	18	U	U	U	UJ	U	UJ	U	U	U	U	U
Arochlor-1232	0.55	18	U	U	U	UJ	U	UJ	U	U	U	U	U
Arochlor-1242	0.55	18	U	U	U	UJ	U	UJ	U	U	U	U	U
Arochlor-1248	0.55	18	U	U	U	UJ	U	UJ	U	U	U	U	U
Arochlor-1254	1.0	33	U	U	U	UJ	U	UJ	U	U	U	U	U
Arochlor-1260	1.0	33	U	U	U	UJ	U	UJ	U	U	U	U	U

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number	Quant Limit	Quant Limit	G305F1 HA1156 09/22/93 ug/Kg	G305F2 HA1157 09/22/93 ug/Kg	B306F1 HA1159 09/20/93 ug/Kg	B306F2 HA1158 09/20/93 ug/Kg	G307F1 HA1144 09/20/93 ug/Kg	G307F2 HA1164 09/20/93 ug/Kg	G307F2DUP HA1178 09/20/93 ug/Kg	B313F1 HA1150 09/21/93 ug/Kg	B313F2 HA1151 09/21/93 ug/Kg	G314F1 HA1152 09/21/93 ug/Kg	G314F2 HA1153 09/21/89 ug/Kg
Laboratory Sample Number	ug/L	ug/Kg											
Sampling Date													
Units													
PRIORITY POLLUTANT INORGANIC PARAMETERS (METALS)													
Antimony	60	6000	U	U	BMDL J	13000	9300 J	BMDL J	BMDL J	9300	8200	17000	6000
Arsenic	10	1000	7800	3500	68000	7900	5900	6500	6200	6300	9200	8600	17000
Beryllium	1.0	100	300	450	2100	440	160	180	BMDL J	770	630	580	170
Cadmium	2.0	200	U	U	1300	U	330	U	U	U	U	U	BMDL J
Chromium	10	1000	9400	16000	41000	16000	9500	8300	4800	13000	19000	79000	11000
Copper	10	1000	26000	17000	22000	16000	9800	11000	9000	32000	20000	44000	14000
Lead	5.0	500	31000	12000	22000	BMDL J	29000	11000	10000	95000	25000	73000	36000
Mercury	0.20	80	BMDL J	U	BMDL J	BMDL J	BMDL J	BMDL J	BMDL J	160	BMDL J	BMDL J	BMDL J
Nickel	20	1000	18000	26000	19000	24000	6700	12000	8800	20000	25000	37000	17000
Selenium	5.0	500	BMDL J	UJ	4400 J	BMDL J	BMDL J	UJ	UJ	BMDL J	U	BMDL J	BMDL J
Silver	10	1000	U	U	U	BMDL J	U	U	U	U	BMDL J	BMDL J	U
Thallium	10	1000	BMDL J	U	3500	BMDL J	U	U	U	BMDL J	U	BMDL J	BMDL J
Zinc	20	2000	59000	48000	150000	49000	52000 J	39000	32000	140000	58000	190000	130000
	mg/L	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg
Cyanide, total	0.010	0.5	U	U	U	U	U	U	U	10.3	1.25	U	U
Phenols, total	0.10	3.0	U	U	6.3	U	U	U	U	U	U	4.6	U

LEGEND:

- U Compound was not detected at laboratory method detection limit.
- J Estimated value due to limitations identified during the quality assurance review.
- UJ Reported method detection limit is estimated due to limitations identified during the quality assurance review.
- B Compound was detected in a laboratory and/or field blank at similar concentrations. May represent laboratory and/or field contamination.
- R Unreliable result. Compound may or may not be present.
- \* Sample analyzed at multiple dilutions. Summary table is a hybrid of diluted and undiluted results.
- No standard available. Compound was qualitatively searched for.
- IND Indeterminate. Standard and/or spikes could not be detected at method detection limit.
- BMDL Below Method Detection Limit reported by laboratory.

Discrepancies may exist between the laboratory data tables and the data validation summary tables due to variations in the rounding of calculations.

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number			B315F1	B315F2	P322F1	P322F2	P323F1	P323F2	P323F2DUP	B331F1	B331F2	G332F1	G332F2
Laboratory Sample Number			HA1173	HA1172	HA1170	HA1171	HA1179	HA1155	HA1154	HA1168	HA1169	HA1160	HA1161
Sampling Date	Quant	Quant	09/19/89	09/19/89	09/22/89	09/22/89	09/20/89	09/20/89	09/21/89	09/22/89	09/22/89	09/21/89	09/22/89
Dilution Factor	Limit	Limit	1.25	2.5	100	500	1	2	2	500	1000	1000	1
Units	ug/L	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
PRIORITY POLLUTANT P/T VOLATILE COMPOUNDS													
Benzene	4.4	4.4	UJ	UJ	8330 J	8750 J	4.3 J	2.2 J	BMDL J	U	3800 J	3800 J	3.6 J
Bromoform	4.7	4.7	UJ	UJ	UJ	UJ	UJ	U	UJ	U	U	UJ	U
Carbon Tetrachloride	2.8	2.8	UJ	UJ	UJ	UJ	UJ	U	UJ	U	U	UJ	U
Chlorobenzene	6.0	6.0	UJ	UJ	376 J	UJ	UJ	U	UJ	U	U	UJ	U
Chlorodibromomethane	3.1	3.1	UJ	UJ	UJ	UJ	UJ	U	UJ	U	U	UJ	U
Chloroethane	10	10	U	U	U	U	R	UJ	U	U	U	U	U
Chloroform	1.6	1.6	U	U	1490	U	1.1 JB	2.04 J	U	U	U	U	1.1 J
Dichlorobromomethane	2.2	2.2	UJ	UJ	UJ	UJ	UJ	U	U	U	U	UJ	U
Dichlorodifluoromethane	10	10	UJ	UJ	U	U	UJ	UJ	U	U	U	UJ	U
1,1-Dichloroethane	4.7	4.7	U	UJ	U	U	U	U	U	U	U	U	U
1,2-Dichloroethane	2.8	2.8	UJ	UJ	U	U	U	U	U	U	U	U	U
1,1-Dichloroethene	2.8	2.8	7.25	8.8 J	3310	7750 J	9.64 J	7.62	U	6650	28700	28700	7.83
1,2-Dichloropropane	6.0	6.0	UJ	UJ	UJ	UJ	UJ	U	UJ	U	U	UJ	U
cis-1,3-Dichloropropene	5.0	5.0	UJ	UJ	UJ	UJ	UJ	U	UJ	U	U	UJ	U
Ethylbenzene	7.2	7.2	UJ	UJ	669 J	UJ	UJ	U	UJ	U	U	UJ	U
Methyl bromide	10	10	U	U	U	U	U	U	U	UJ	U	U	U
Methyl chloride	10	10	U	U	U	U	U	UJ	U	U	U	U	U
Methylene Chloride	2.8	2.8	98.1 JB	205 JB	146000	450000 J	240 J	215 J	126 JB	22300 JB	21000 B	21000 JB	297 B
1,1,2,2-Tetrachloroethane	4.1	4.1	UJ	UJ	UJ	UJ	UJ	U	U	U	U	UJ	U
Tetrachloroethene	4.1	4.1	UJ	UJ	390 J	UJ	UJ	U	U	U	U	UJ	U
Toluene	6.0	6.0	UJ	UJ	3730 J	1280 J	6.9 JB	12.4	3.3 J	1028 J	2280 J	2280 J	2.4
1,2-Dichloroethene (trans)	1.6	1.6	UJ	UJ	276	U	U	U	U	U	U	U	U
1,1,1-Trichloroethane	3.8	3.8	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	U	UJ	UJ
1,1,2-Trichloroethane	5.0	5.0	UJ	UJ	592000 J	927000 J	9.44 J	16.3 J	117 J	22300	12000	12000 J	38.6
Trichloroethene	1.9	1.9	UJ	UJ	293 J	UJ	UJ	U	UJ	U	U	UJ	U
Trichlorofluoromethane	10	10	UJ	UJ	U	U	2.5 J	UJ	U	UJ	U	UJ	5.7 J
Vinyl Chloride	10	10	UJ	U	U	3270 J	15.2	U	U	U	15000	15000	8.0 J
trans-1,3-Dichloropropene	10	10	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	U	UJ	UJ

continued next page (see last page of table for notes)



TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number Laboratory Sample Number	Quant Limit ug/L	Quant Limit ug/Kg	B315F1 HA1173 09/19/89 2.8 ug/Kg	B315F2 HA1172 09/19/89 2.23 ug/Kg	P322F1 HA1170 09/22/89 2.5 ug/Kg	P322F2 HA1171 09/22/89 3.0 ug/Kg	P323F1 HA1179 09/20/89 2.3 ug/Kg	P323F2 HA1155 09/20/89 2.3 ug/Kg	P323F2DUP HA1154 09/21/89 2.7 ug/Kg	B331F1 HA1168 09/22/89 25 ug/Kg	B331F2 HA1169 09/22/89 35 ug/Kg	G332F1 HA1180 09/21/89 2.4 ug/Kg	G332F2 HA1161 09/22/89 2.3 ug/Kg
PRIORITY POLLUTANT ACID EXTRACTABLE COMPOUNDS													
2-Chlorophenol	3.9	340	U	U	U	U	U	U	U	U	U	U	U
2,4-Dichlorophenol	3.2	280	380 J	U	5640	1040	U	U	U	U	U	2690	374 J
2,4-Dimethylphenol	3.2	280	U	U	U	U	U	U	U	U	U	U	U
4,6-Dinitro-2-methylphenol	29	2400	U	U	U	U	U	U	U	U	U	U	U
2,4-Dinitrophenol	50	4300	U	U	U	U	U	U	U	U	U	U	U
2-Nitrophenol	4.3	370	U	U	U	U	U	U	U	U	U	U	U
4-Nitrophenol	2.9	240	U	U	U	U	U	U	U	U	U	U	U
4-Chloro-3-methylphenol	3.6	310	U	U	U	U	U	U	U	U	U	U	U
Pentachlorophenol	4.3	370	U	U	U	U	U	U	U	U	U	U	U
Phenol	1.8	150	U	U	28800	18800	U	U	U	56500	18600	28700	U
2,4,6-Trichlorophenol	3.2	280	U	U	U	U	U	U	U	U	U	U	U

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number Laboratory Sample Number	Quant Limit ug/L	Quant Limit ug/Kg	B315F1 HA1173 09/19/89 2.8 ug/Kg	B315F2 HA1172 09/19/89 2.23 ug/Kg	P322F1 HA1170 09/22/89 2.5 ug/Kg	P322F2 HA1171 09/22/89 3.0 ug/Kg	P323F1 HA1179 09/20/89 2.3 ug/Kg	P323F2 HA1155 09/20/89 2.3 ug/Kg	P323F2DUP HA1154 09/21/89 2.7 ug/Kg	B331F1 HA1168 09/22/89 ug/Kg	B331F2 HA1169 09/22/89 35 ug/Kg	G332F1 HA1160 09/21/89 2.4 ug/Kg	G332F2 HA1161 09/22/89 2.3 ug/Kg
Units	ug/L	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
PRIORITY POLLUTANT BASE/NEUTRAL	EXTRACT	TABLE	COMPOUNDS										
Acenaphthene	2.3	220	U	U	2160	1240	4330	U	U	U	19900	1160	U
Acenaphthylene	4.2	410	U	U	5390	U	U	U	U	U	U	BMDL	U
Anthracene	2.3	220	U	U	4180	2650	11100	U	U	7900	55700	2220	664
Benzo(a)anthracene	9.3	910	U	U	BMDL	3800	20000	U	U	BMDL	101000	3160	BMDL
Benzo(a)pyrene	3.0	290	U	U	1070	2690	17100	U	U	12800	83000	2830	1070
Benzo(b)fluoranthene	5.7	560	U	U	BMDL	3220	29100	U	U	22100	80400	2840	1670
Benzo(g,h,i)perylene	4.9	480	U	U	U	1900	U	U	U	BMDL	51100	1660	BMDL
Benzo(k)fluoranthene	3.0	290	U	U	U	BMDL	3150	U	U	U	14800	BMDL	U
bis(2-Chloroethoxy)methane	6.3	620	U	U	U	U	U	U	U	U	U	U	U
Bis(2-chloroethyl) ether	6.8	660	U	U	U	U	U	U	U	U	U	U	U
bis(2-chloroisopropyl) ether	6.8	660	R	R	R	R	R	R	R	R	R	R	R
bis(2-Ethylhexyl)phthalate	12	1200	351 JB	704 JB	771 JB	1216 JB	6690 B	653 JB	6220 B	U	U	BMDL	BMDL
4-Bromophenylphenyl ether	2.3	220	U	U	U	U	U	U	U	U	U	U	U
Butylbenzylphthalate	12	1200	U	U	U	U	U	U	U	U	U	U	U
2-Chloronaphthalene	2.3	220	U	U	U	U	U	U	U	U	U	U	U
4-Chlorophenylphenyl ether	5.0	490	U	U	U	U	U	U	U	U	U	U	U
Chrysene	3.0	290	U	U	1910	3420	19200	U	U	14400	93800	3000	1120
Dibenz(a,h)anthracene	3.0	290	U	U	U	U	U	U	U	U	BMDL	U	U
1,2-Dichlorobenzene	2.3	220	U	U	U	U	U	U	U	U	U	U	U
1,3-Dichlorobenzene	2.3	220	U	U	U	U	U	U	U	U	U	U	U
1,4-Dichlorobenzene	5.2	510	U	U	U	U	U	U	U	U	U	U	U
3,3'-Dichlorobenzidine	19.6	1920	U	U	U	U	U	U	U	U	U	U	U
Diethylphthalate	12	1200	U	U	3220	635 J	U	U	U	U	U	U	U
Dimethylphthalate	12	1200	U	U	U	U	U	U	U	U	U	U	U
Di-n-butylphthalate	12	1200	1430 JB	1350 JB	3220 JB	2299 JB	4530 BJ	8870	2260 JB	U	378 JB	1167 JB	BMDL B
2,4-Dinitrotoluene	6.8	660	U	U	U	U	U	U	U	U	U	U	U
2,6-Dinitrotoluene	2.3	220	U	U	U	U	U	U	U	U	U	U	U
Di-n-octylphthalate	12	1200	U	4290	U	BMDL	310 JB	U	777 JB	U	U	U	U
Fluoranthene	2.6	260	U	U	3780	8190	42300	U	U	30800	248000	6830	2700
Fluorene	2.3	220	U	U	5480	2570	5880	U	U	5100	27900	2250	635
Hexachlorobenzene	2.3	220	U	U	930	U	U	U	U	U	U	U	U
Hexachlorobutadiene	1.1	100	U	U	U	U	U	U	U	U	U	U	U
Hexachlorocyclopentadiene	12	1200	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Hexachloroethane	1.9	190	U	U	U	U	U	U	U	U	U	U	U
Indeno(1,2,3-cd)pyrene	4.4	430	U	U	U	BMDL	U	U	U	BMDL	21500	1038 JB	BMDL B
Isophorone	2.6	260	U	U	684	U	U	U	U	U	U	U	U
Naphthalene	1.9	190	U	U	25900	7640	3500	U	U	U	U	6220	U
Nitrobenzene	2.3	220	U	U	U	U	U	U	U	U	U	U	U
N-Nitroso-dimethylamine	12	1200	U	U	U	U	U	U	U	U	U	U	U
N-Nitroso-di-n-propylamine	12	1200	U	U	U	U	U	U	U	U	U	U	U
N-Nitroso-diphenylamine	2.3	220	U	U	U	U	U	U	U	U	U	U	U
Phenanthrene	6.4	630	U	U	15600	13300	38500	U	U	33800	226000	9540	3550
Pyrene	2.3	220	U	U	4920	6910	31400	U	U	22900	218000	6470	2210
1,2,4-Trichlorobenzene	2.3	220	U	U	U	U	U	U	U	U	U	U	U

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number Laboratory Sample Number Sampling Date Dilution Factor Units	Quant Limit ug/L	Quant Limit ug/Kg	B315F1 HA1173 09/19/89 4235 ug/Kg	B315F2 HA1172 09/19/89 3.0 ug/Kg	P322F1 HA1170 09/22/89 165 ug/Kg	P322F2 HA1171 09/22/89 188 ug/Kg	P323F1 HA1179 09/20/89 71 ug/Kg	P323F2 HA1155 09/20/89 3471 ug/Kg	P323F2DUP HA1154 09/21/89 82 ug/Kg	B331F1 HA1168 09/22/89 182 ug/Kg	B331F2 HA1169 09/22/89 200 ug/Kg	G332F1 HA1160 09/21/89 162 ug/Kg	G332F2 HA1161 09/22/89 38 ug/Kg
PESTICIDES													
Aldrin	0.05	1.7	U	U	U	U	U	U	UJ	U	U	U	U
Alpha-BHC	0.05	1.7	U	U	U	U	U	U	UJ	U	U	U	U
Beta-BHC	0.05	1.7	U	U	U	U	U	U	UJ	U	U	U	U
Gamma-BHC (Lindane)	0.05	1.7	U	U	U	U	U	U	UJ	U	U	U	U
Delta-BHC	0.05	1.7	U	U	U	U	U	U	UJ	U	U	U	U
Chlordane	1.0	33	U	U	U	U	U	U	UJ	U	U	U	U
4,4'-DDT	0.10	3.3	U	U	U	U	U	U	UJ	U	U	U	U
4,4'-DDE	0.10	3.3	U	U	U	U	U	U	UJ	U	U	U	U
4,4'-DDD	2.5	83	U	U	U	U	U	U	UJ	U	U	U	U
Dieldrin	0.10	3.3	U	U	U	U	U	U	UJ	U	U	U	U
Endosulfan I	0.05	1.7	U	U	U	U	U	U	UJ	U	U	U	U
Endosulfan II	0.10	3.3	U	U	U	U	U	U	UJ	U	U	U	U
Endosulfan Sulfate	0.10	3.3	U	U	U	U	U	U	UJ	U	U	U	U
Endrin	0.10	3.3	U	U	U	U	U	U	UJ	U	U	U	U
Endrin Aldehyde	0.10	3.3	U	U	U	U	U	U	UJ	U	U	U	U
Heptachlor	0.05	1.7	U	U	U	U	U	U	UJ	U	U	U	U
Heptachlor Epoxide	0.05	1.7	U	U	U	U	U	U	UJ	U	U	U	U
Toxaphene	2.0	65	U	U	U	U	U	U	UJ	U	U	U	U
Arochlor-1016	0.55	18	U	U	U	U	U	U	UJ	U	U	U	U
Arochlor-1221	0.55	18	U	U	U	U	U	U	UJ	U	U	U	U
Arochlor-1232	0.55	18	U	U	U	U	U	U	UJ	U	U	U	U
Arochlor-1242	0.55	18	U	U	U	U	U	U	UJ	U	U	U	U
Arochlor-1248	0.55	18	U	U	U	U	U	U	UJ	U	U	U	U
Arochlor-1254	1.0	33	U	U	U	U	U	U	UJ	U	U	U	U
Arochlor-1260	1.0	33	U	U	U	U	U	U	UJ	U	U	U	U

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number Laboratory Sample Number Sampling Date Units	Quant Limit ug/L	Quant Limit ug/Kg	B315F1 HA1173 09/19/89 ug/Kg	B315F2 HA1172 09/19/89 ug/Kg	P322F1 HA1170 09/22/89 ug/Kg	P322F2 HA1171 09/22/89 ug/Kg	P323F1 HA1179 09/20/89 ug/Kg	P323F2 HA1155 09/20/89 ug/Kg	P323F2DUP HA1154 09/21/89 ug/Kg	B331F1 HA1168 09/22/89 ug/Kg	B331F2 HA1169 09/22/89 ug/Kg	G332F1 HA1160 09/21/89 ug/Kg	G332F2 HA1161 09/22/89 ug/Kg
PRIORITY POLLUTANT INORGANIC PARAMETERS (METALS)													
Antimony	60	6000	8500	BMDL J	U	U	U	9300	BMDL J	U	U	U	U
Arsenic	10	1000	67000	18000	560000	24000	22000	6500	6900	6400	BMDL J	5700	4400
Beryllium	1.0	100	1800	1000	1100	240	2300	160	BMDL J	410	BMDL J	830	730
Cadmium	2.0	200	2100	890	U	U	4300	U	U	4000	BMDL J	U	U
Chromium	10	1000	43000	25000	23000	10000	46000	5500	4200	14000	12000	54000	25000
Copper	10	1000	28000	16000	48000	13000	21000	8400	6100	33000	46000	56000	22000
Lead	5.0	500	33000	30000	85000	16000	46000	BMDL J	BMDL J	330000	360000	92000	53000
Mercury	0.20	80	U	U	6500	110	130	U	BMDL J	390	530	U	U
Nickel	20	1000	20000	16000	29000	14000	17000	9600	7700	13000	16000	30000	21000
Selenium	5.0	500	4200	BMDL J	BMDL J	U	6900 J	BMDL J	BMDL J	BMDL J	BMDL J	BMDL J	BMDL J
Silver	10	1000	BMDL J	BMDL J	BMDL J	BMDL J	BMDL J	U	BMDL J	BMDL J	BMDL J	U	BMDL J
Thallium	10	1000	3800	BMDL J	1600	BMDL J	2600	U	BMDL J	BMDL J	U	BMDL J	BMDL J
Zinc	20	2000	210000	130000	110000	35000	260000	40000	32000	170000	311000	160000	270000
	mg/L	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg
Cyanide, total	0.010	0.5	U	U	1.31	U	1.62	U	U	0.652	1.09	U	U
Phenols, total	0.10	3.0	U	U	29	23.3	U	U	7.6	11.4	U	5.2	U

LEGEND:

- U Compound was not detected at laboratory method detection limit
  - J Estimated value due to limitations identified during the quality assurance review.
  - UJ Reported method detection limit is estimated due to limitations identified during the quality assurance review.
  - B Compound was detected in a laboratory and/or field blank at similar concentrations. May represent laboratory and/or field contamination.
  - R Unreliable result. Compound may or may not be present.
  - \* Sample analyzed at multiple dilutions. Summary table is a hybrid of diluted and undiluted results.
  - No standard available. Compound was qualitatively searched for.
  - IND Indeterminate. Standard and/or spikes could not be detected at method detection limit.
  - BMDL Below Method Detection Limit reported by laboratory.
- Discrepancies may exist between the laboratory data tables and the data validation summary tables due to variations in the rounding of calculations.



**DATA VALIDATION/QUALITY ASSURANCE REVIEW  
PHASE I RCRA FACILITY INVESTIGATION  
CHEM-WASTE MANAGEMENT, INC. - CHICAGO INCINERATOR SITE  
SAMPLE COLLECTION DATES: SEPTEMBER 25 THROUGH 27, 1989  
DAMES & MOORE JOB NO.: 13963-055-192**

**LABORATORY REPORT NO.: 350200, 350202 & 350205**

**INTRODUCTION**

A total of twenty four (24) soil samples, plus four (4) field-duplicate soil samples were collected and submitted to Environmental Testing and Certification (ETC) of Edison, New Jersey (1992 Illinois Certification No. 100224). The samples included in the review are listed on Table 1. All twenty eight (28) samples were analyzed for Priority Pollutant Volatile Organic Compounds (VOA), Semivolatile Organic Compounds (BNA), Organochlorine Pesticides and Polychlorinated Biphenyls (PCBs), metals, total cyanide (CN) and total phenol. All samples were analyzed following USEPA SW-846 Methodologies.

Data were examined to assess the usability of the results. The organic data quality review is based upon a rigorous review of the reported hold times, surrogate recovery results, blank spike recoveries, matrix spike and matrix spike duplicate analyses, blank contaminants, internal standard area performance, Gas Chromatography/Mass Spectroscopy (GC/MS) tuning and calibration data.

The inorganic and conventional parameter findings offered in this report are based upon review of the reported hold times, blank analysis results, blank spike recoveries, matrix spike recoveries, duplicate results, instrument calibration verification, post-digestion spike recoveries and Inductively Coupled Plasma (ICP) serial dilution analyses.

The analytical data was presented in an ETC Abbreviated Data Format as requested by Chemical Waste Management, Inc. The laboratory retrieved the archived support documentation for the data validation review; however, not all support documentation was retrievable by the laboratory. Therefore, a quality assurance review rather than data validation is provided for select data points. The quality assurance reviews are not as rigorous as quantitative data validation and for these data, the



quality assurance review assumes the analytical results are correct as reported and merely provides an interpretation of the reported quality control results.

Details of the data validation/quality assurance review are presented in the narrative section of the report. The data is summarized in Table 2 of the report. Data qualifiers have been placed next to the results so that the data user can quickly assess the qualitative and/or quantitative reliability of the reported result. This report was prepared to provide a critical review of the laboratory analysis and reported chemical results. Quality assurance reviews of laboratory-generated data routinely identify problems associated with analytical measurements, even from the most experienced and capable laboratories.

This review has been performed in accordance with the requirements specified in the "Laboratory Data Validation Functional Guidelines for Evaluating Organic Analyses" dated February 1988 and "Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses" dated July 1988.

**TABLE 1**

**SAMPLES INCLUDED IN REVIEW**

<u>Sample ID</u>	<u>Lab ID</u>	<u>Collection Date</u>	<u>Analyses Requested*</u>
<u>Laboratory Log Link No. 350200</u>			
SP329F1	HA1145	9/25/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
SP312F2	HA1148	9/25/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
SP312F1	HA1149	9/25/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
SP328F2	HA1174	9/25/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
SP328F1	HA1175	9/25/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
SP329F2	HA1180	9/25/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
SP329F2-Dup	HA1181	9/25/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols

Laboratory Log Link No. 350202

SB320F1	HA1143	9/26/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
SB327F2	HA1146	9/26/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
SB327F1	HA1147	9/26/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
SB338F1	HA1162	9/26/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
SB338F2	HA1163	9/26/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
SB311F1	HA1166	9/26/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
SB311F2	HA1167	9/26/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
SB321F1	HA1176	9/26/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
SB321F2	HA1177	9/26/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols

Laboratory Log Link No. 350205

SB320F2	HA1412	9/27/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
SB310F1-Dup	HA1413	9/27/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
SB326F1	HA1418	9/27/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
SB326F1-Dup	HA1419	9/27/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
SB326F2	HA1424	9/27/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
SB326F2-Dup	HA1425	9/27/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
SB309F1	HA1426	9/27/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
SB309F2	HA1427	9/27/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
SB325F1	HA1430	9/27/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
SB325F2	HA1431	9/27/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
SB310F1	HA1432	9/27/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
SB310F2	HA1433	9/27/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols

Legend:

PP VOA	=	Priority Pollutant Volatile Organic Compounds
PP BNA	=	Priority Pollutant Semi-volatile Organic Compounds (Base/Neutral/Acid Extractable Compounds)
PP Pest/PCB	=	Priority Pollutant Organochlorine Pesticides and Polychlorinated Biphenyls
PP Metals	=	Priority Pollutant Inorganic Parameters
CN	=	Total Cyanide
Phenols	=	Total Phenol

DATA QUALIFIERS

The data validation review has identified aspects of the analytical data that require qualification. To confidently use any of the data within the data set, the data user should understand the limitations and qualifications presented. With regard to data usability, the following qualifiers are offered based upon the data provided.

ORGANIC QUALIFIERS

Hold Times:

- Samples SB320F2, SB327F1, SB338F1 and SB311F1 (Log Link 350202) were analyzed for volatile organic compounds 1 to 4 days outside the recommended hold time. There is no impact on data usability and no qualifier has been applied.
- Samples SB327F2, SB338F2, SB311F2, SB321F2 (Log Link 350202) and SB320F2, SB310F1-Dup, SB326F1 and SB326F1-Dup were analyzed for volatile organic compounds 5 days outside the recommended hold time. The positive and non-detected results may be biased low and have been flagged (J/UJ) estimate on Table 2.

#### Blank Contamination:

- Due to the trace presence of the following volatile organic compounds (VOAs) in the associated laboratory and/or field blank samples, positive results of the following compounds in the field samples are qualitatively questionable and have been flagged (B) on Table 2 of this report. Reported concentrations which are greater than 5 times the blank concentration (10 times for methylene chloride) are regarded as "real" values and no qualifier is applied.

<u>Analyte</u>	<u>Associated Samples</u>
Methylene chloride	All samples in LL 350200, 350202, 350205
1,1,2-Trichloroethane	All samples in LL 350200 except SB329F2, SB310F1, SB310F1-Dup, SB329F2, SB312F1, SB312F2, SB328F1, SB328F2
Benzene	SB315F2, SB315F1, SB326F2-Dup

- Due to the trace presence of the following semi-volatile organic compounds (VOAs) in the associated laboratory and/or field blank samples, positive results of the following compounds in the field samples are qualitatively questionable and have been flagged (B) on Table 2. Positive concentrations which are greater than five times the blank concentrations (ten times for phthalates) are regarded as "real" values and no qualifier is applied.

<u>Analyte</u>	<u>Associated Samples</u>
Bis(2-Ethylhexyl)phthalate & di-n-Butyl phthalate	All field Samples in LL 350200, 350202 & 350205

#### Surrogate Recoveries:

- All volatile surrogate compound recoveries fell within acceptable control limits.
- The semi-volatile surrogate compound, terphenyl-d14, fell outside control limits (high) for all samples in Log Link 350200, SB326F1, SB326F1-Dup, SB325F1 (LL 350202), SB311F2, SB320F1 and SB321F2. No qualifier is required since only one surrogate per fraction fell outside control limits.
- The pesticide surrogate compounds, tetra-chloromethyl-xylene (TCMX) and dibutylchlorendate (DBC), fell outside control limits (high) for samples SB328F1 (LL 350200), SB320F1, SB327F2, SB311F2 (LL 350202)

and all field samples in LL 350205. Positive results may be biased high, however, there is no impact on the non-detected results and no qualifier has been applied.

#### Initial and Continuing Calibration Results:

- Due to the high difference between the initial and continuing calibration response factors (%D >35% and <90%), all positive results for the following volatile compounds have been flagged (J) estimated. The actual detection limit may be higher than reported and has been flagged (UJ) estimated in Table 2 of this report.

<u>Analyte</u>	<u>Associated Sample</u>
Methylene chloride	SB320F1, SB329F2, SB229F2-Dup, SB325F1, SB325F2, SB326F2, SB309F2, SB338F1, SB329F1, SB312F1, SB312F2, SB328F1, SB328F2, SB326F2-Dup, SB309F1
Dichlorodifluoromethane	SB326F2-Dup
Trichlorotrifluoromethane	SB329F1, SB312F1, SB312F2, SB328F1, SB328F2, SB326F2-Dup
1,1,1-Trichloroethane, Carbon tetrachloride & trans-1,3-Dichloropropene	SB329F1, SB312F1, SB312F2, SB328F1, SB328F2
Chloroethane	SB327F1, SB338F2, SB321F2, SB320F2, SB311F2, SB327F2, SB310F1-Dup, SB326F1, SB326F1-Dup
Methyl bromide & Trichloroethene	SB326F2-Dup
Vinyl chloride	SB326F2-Dup, SB309F1, SB311F1

- Due to the high difference between the initial and continuing calibration response factors (%D >35% and <90%), all positive results for the following semi-volatile compounds have been flagged (J) estimated on Table 2 of this report.

<u>Analyte</u>	<u>Log Link</u>	<u>Associated Sample</u>
Hexachlorocyclopentadiene	350200	All field samples
2,4-Dinitrophenol	352020 350205	All field samples All field samples

<u>Analyte</u>	<u>Log Link</u>	<u>Associated Sample</u>
4,6-Dinitro-o-methylphenol	350202 350205	SB320F2, SB326F1, SB326F1-Dup, SB310F1-Dup, SB309F1, SB325F1, SB326F2-Dup
Fluoranthene & 3,3-Dichlorobenzidine	350202 350205	SB320F2, SB326F1, SB326F1-Dup, SB310F1-Dup, SB309F1, SB325F1, SB326F2-Dup
Pentachlorophenol & Pyrene	350202 350205	SB311F2, SB321F2, SB327F2, SB338F1, SB338F2 SB309F2, SB310F2, SB320F2, SB326F2, SB310F1

- In the Pesticide/PCB fraction, the support documentation could not be retrieved by the laboratory for all field samples included in Log Links 350202 and 350205. The pesticide/PCB results for the aforementioned samples are assumed to be correct as reported by the laboratory and any data biases (high or low) were noted based upon an evaluation of the limited data provided.
- For the pesticide/PCB analyses, the correlation coefficient for the initial calibration fell within acceptable control limits ( $>0.995$ ) for all samples in LL 250200.
- For the pesticide/PCB analyses, the analytical sequence requirements were met. However, since the standard chromatograms were not available for review (quantitation reports only), no comments can be offered regarding an evaluation of the system performance to ensure adequate resolution.
- The DDT/Endrin breakdown associated with LL 350200 was evaluated and fell within acceptable control limits. The combined DDT/Endrin breakdown was greater than 30% on the confirmatory column; however, there is no impact on data usability since no samples in this log link were positive for either DDT, Endrin, or their breakdown products.
- For the pesticide/PCB analyses, the majority of the sample chromatograms exhibited negative peaks at retention times of 14 minutes and 21 minutes. The lack of baseline stability may result in false negatives. Since the chromatograms associated with the standard analyses were not provided for review, it can not be ascertained if the problem is analytical or matrix dependent. However, based upon the retention times provided for Ind. Standards A and B, the negative peaks do not appear to impact on data quality.

#### Internal Standard Area Performance:

- The area count of the volatile internal standards, difluorobenzene and chlorobenzene-d5, associated with samples SB327F2, SB321F2 (LL 350202), SB326F1, SB3326F1-Dup, SB326F2, SB326F2-Dup, SB309F2, SB325F1, SB325F2 and SB310F1 (LL 350205) were reported outside the control limits (low). The positive and non-detected compounds quantitated against these internal standards for these samples may be biased low and have been flagged (J/UJ) estimated on Table 2.
- The area count of all three volatile internal standards associated with samples SB312F1, SB312F2, SB328F1, SB328F2, SB329F2-Dup (LL 350200), SB327F1, SB338F1 (LL 350202), SB310F1-Dup and SB310F2 (LL 350205) were reported outside the control limits (low). The positive and non-detected compounds quantitated against these internal standards for this sample may be biased low and have been flagged (J/UJ) estimated on Table 2.
- The area count of the semi-volatile internal standards, phenanthrene-d10, chrysene-d12 and perylene-d12, associated with sample SB328F2, were reported outside the control limits (low). The positive and non-detected compounds quantitated against these internal standards for this samples may be biased low and have been flagged (J/UJ) estimated on Table 2.
- The area count of the semi-volatile internal standards, chrysene-d12 and perylene-d12, associated with samples SB329F2-Dup, SB327F1, SB311F2 and perylene-d12 only for sample SB321F2, were reported outside the control limits (low). The positive and non-detected compounds quantitated against these internal standards for this samples may be biased low and have been flagged (J/UJ) estimated on Table 2.
- The area count of the semi-volatile internal standards, 1,4-dichlorobenzene-d4, naphthalene-d8, acenaphthene-d10 and phenanthrene-d10, associated with samples SB320F1, SB326F1, SB326F1-Dup, SB326F2-Dup and 1,4-dichlorobenzene-d4, acenaphthene-d10 and phenanthrene-d10, associated with sample SB309F1, were reported outside the control limits (low). The positive and non-detected compounds quantitated against these internal standards for this samples may be biased low and have been flagged (J/UJ) estimated on Table 2.

#### Matrix Spikes (MS) and Matrix Spike Duplicate (MSD) Results:

- Field duplicate samples SB326F1 and SB326F1-Dup (LL 350205), SB326F2 and SB326F2-Dup (LL 350205) and SB329F2 and SB329F2-Dup

(LL 350205) were collected and submitted to the laboratory. Overall, the reproducibility of the organic results are good, providing a positive indication of the field techniques and laboratory precision associated with these samples. In the volatile analysis of duplicate samples SB329F2, a high relative percent difference was obtained for the analysis of trichloroethene, vinyl chloride and trichlorofluoromethane. The variability in these results may be due to a lack of sample homogeneity. The positive and non-detected results for these compounds are regarded as estimated values and have been flagged (J/UJ) on Table 2.

Additional Comments:

- As per the requirements, all values calculated below the method detection limit should be considered estimated and have been flagged (J) in Table 2 of this report.

INORGANIC and CONVENTIONAL PARAMETER QUALIFIERS

General Comments:

- In the metals fraction, this reviewer has observed that for the ICP concentrations reported at 10 to 15 times above the method detection limit (MDL), the data validation cannot reproduce the laboratory reported results. The calculation obtained during data validation is consistently higher than the laboratory reported concentration. This is due to the fact that the interelement correction factors in the ICP instrument have been externally calculated. Since this external interelement correction factor is not available for review, the reported results for low level samples cannot be reproduced. It should be noted that positive ICP reported results that are significantly above than the MDL were reproduced and validated, since this interelement correction factor becomes negligible at higher concentrations. The data review assumes that the low level reported concentrations are correct as reported and it is this reviewer's opinion that data usability is not impacted.

Hold Times:

- All samples were digested and analyzed within the required hold time criteria for metals and cyanide. The preparation and analysis date of the total phenols was not available for review; however, based upon the date of report, it appears that the hold time criteria was met for the total phenols analyses as well.

#### Blank Contamination:

- No blank contaminants have been identified that require qualification on the metals or cyanide for the samples included in log links (LL) 350200, 350202 and 350203.

#### Inductively Coupled Plasma (ICP) Serial Dilution Results:

- The ICP serial dilution analyses associated with sample SP329F1 were within acceptable control limits.
- The percent differences of the ICP Serial Dilution analyses for chromium and zinc associated with sample SB320F1 were greater than 10%. The positive chromium and zinc result in this sample are quantitatively questionable and have been flagged (J) estimated on Table 2.
- The percent differences of the ICP Serial Dilution analyses for nickel, lead and zinc associated with sample SB320F2 were greater than 10%. The positive nickel, lead and zinc result in this sample are quantitatively questionable and have been flagged (J) estimated on Table 2.

#### Matrix Spike (MS) and Duplicate (DU) Summary Results:

- The matrix spike recovery of cadmium, chromium and selenium were outside control limits (low) for MS sample SP329F1. The matrix spike recovery of antimony and nickel were outside control limits (low) for MS sample SB320F1. The matrix spike recovery of cadmium, lead and antimony were outside control limits (low) for MS sample SB320F2. The positive results in the unspiked sample may be biased low and have been flagged (J) estimated on Table 2.
- The matrix spike compound antimony was not recovered (0%) for MS sample SP329F1. The non-detected antimony result in the unspiked sample is unreliable (compound may or may not be present) and has been flagged (R) on Table 2.
- The matrix spike recovery of copper and lead were outside control limits (high) for MS sample SB320F1. The positive copper and lead results in the unspiked sample may be biased high and have been flagged (J) estimated on Table 2. There is no impact on the non-detected results and no qualifier is required.
- The matrix spike recovery of lead, zinc and arsenic were outside control limits (low) for MS sample SP329F1, and low for zinc only in MS sample



SB320F2 (low). The matrix spike recoveries of arsenic and zinc were high for MS sample SB320F1. However, no qualifier is applied since the concentrations in the unspiked sample are greater than 4 times the spike concentration.

- Due to the high relative percent difference between the duplicate results of lead, selenium and thallium in SP329F1, and lead and beryllium in sample SB320F1 the positive results of these analytes are regarded as estimated values and have been flagged (J) on Table 2.
- Field duplicate samples SB329F2 and SB329F2-Dup (LL 350200), SB310F1 and SB310F1-Dup (LL 350202) and SB326F2 and SB326F2-Dup (LL 350205) were collected and submitted to the laboratory. Overall, the reproducibility of the metal and cyanide results are good, providing a positive indication of the field techniques and laboratory precision associated with these samples. A high relative percent difference (RPD) was noted between duplicate results for antimony and arsenic in duplicate samples SB326F1. A high RPD was noted between duplicate results for zinc in duplicate samples SB326F2. A high RPD was noted between duplicate results for antimony and cadmium in duplicate samples SB310F1. The positive results for the aforementioned samples are regarded as estimated values and have been flagged (J) on Table 2.

#### Post-Digestion Spike Recoveries:

- The post-digestion spike recoveries of the following analytes were outside the control limits (low). Positive and/or non-detected results of these analytes for the associated samples may be biased low and have been flagged (J/UJ) estimated.

<u>Analyte</u>	<u>Log Link</u>	<u>Associated Samples</u>
Arsenic	350205	SB310F1
Selenium	350200	All field samples
	350202	SB321F2
	350205	SB326F2, SB326F2-Dup, SB309F1, SB309F2, SB325F1, SB325F2, SB310F1, SB310F2
Thallium	350200	All field samples
	350202	SB321F2
	350205	SB310F1-Dup

- The post-spike recoveries of the following analytes were recovered outside the control limits (high). Positive results of these analytes for the associated samples may be biased high and have been flagged (J) estimated in Table 2 of this report.

<u>Analyte</u>	<u>Log Link</u>	<u>Associated Sample</u>
Thallium	350197	SP323F2-Dup

Additional Comments:

- The laboratory reports several inorganic results as below the method detection limit (BMDL). These are reported as BMDL on Table 2. The actual concentrations are not calculated during the data validation review since the interelement coefficient factors were not provided.

TABLE 2  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number			SB309F1	SB309F2	SB310F1	SB310F1DUP	SB310F2	SB311F1	SB311F2	SB312F1	SB312F2
Laboratory Sample Number			HA1426	HA1427	HA1432	HA1413	HA1433	HA1166	HA1167	HA1149	HA1148
Sampling Date			9/27/93	9/27/93	9/27/93	9/27/93	9/27/93	9/26/93	9/26/93	9/25/93	9/25/93
Dilution Factor			10	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Units	Quant Limit (ug/L)	Quant Limit (ug/Kg)	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
PRIORITY POLLUTANT P/T VOLATILE COMPOUNDS											
Benzene	4.4	4.4	7240	14.1 J	1.9 J	2.8 J	UJ	13100	6.28 J	2 J	2 J
Bromoform	4.7	4.7	U	UJ	UJ	UJ	UJ	U	UJ	UJ	UJ
Carbon Tetrachloride	2.8	2.8	U	UJ	UJ	UJ	UJ	U	UJ	UJ	UJ
Chlorobenzene	6.0	6.0	543	UJ	UJ	UJ	UJ	76700	8.98 J	UJ	UJ
Chlorodibromomethane	3.1	3.1	U	UJ	UJ	UJ	UJ	U	UJ	UJ	UJ
Chloroethane	10	10	U	U	U	UJ	UJ	U	UJ	UJ	UJ
Chloroform	1.6	1.6	801	U	U	UJ	UJ	U	UJ	UJ	UJ
Dichlorobromomethane	2.2	2.2	U	U	U	UJ	UJ	U	UJ	UJ	UJ
Dichlorodifluoromethane	10	10	U	U	U	UJ	UJ	U	UJ	UJ	UJ
1,1-Dichloroethane	4.7	4.7	170	U	U	UJ	UJ	U	UJ	UJ	UJ
1,2-Dichloroethane	2.8	2.8	1140	U	U	UJ	UJ	U	UJ	UJ	UJ
1,1-Dichloroethene	2.8	2.8	36900	14.1	U	2.7 J	UJ	U	UJ	3.31 J	5.11 J
1,2-Dichloropropane	6.0	6.0	U	UJ	UJ	UJ	UJ	U	UJ	UJ	UJ
cis-1,3-Dichloropropene	5.0	5.0	U	UJ	UJ	UJ	UJ	U	UJ	UJ	UJ
Ethylbenzene	7.2	7.2	329	UJ	UJ	UJ	UJ	9490	1.0 J	UJ	UJ
Methyl bromide	10	10	U	U	U	UJ	UJ	U	UJ	UJ	UJ
Methyl chloride	10	10	U	U	U	UJ	UJ	U	UJ	UJ	UJ
Methylene Chloride	2.8	2.8	31600 J	154 J	55.4 JB	160 JB	41.6 JB	5090	23.4 JB	140 JB	220 JB
1,1,2,2-Tetrachloroethane	4.1	4.1	U	UJ	UJ	UJ	UJ	U	UJ	UJ	UJ
Tetrachloroethene	4.1	4.1	103	UJ	UJ	UJ	UJ	U	UJ	UJ	UJ
Toluene	6.0	6.0	77800	BMDL J	UJ	2.3 J	UJ	12600	5 J	UJ	UJ
1,2-Dichloroethene (trans)	1.6	1.6	167	UJ	27.9 J	13.3 J	UJ	U	UJ	2.44 J	UJ
1,1,1-Trichloroethane	3.8	3.8	192	UJ	UJ	UJ	UJ	U	UJ	4.0 J	2 J
1,1,2-Trichloroethane	5.0	5.0	109000	UJ	13.8 JB	13.3 J	16.4 JB	U	6.92 J	14.1 J	10.2 J
Trichloroethene	1.9	1.9	195	UJ	28.9 J	20.8 J	UJ	U	UJ	UJ	U
Trichlorofluoromethane	10	10	U	U	8.7 J	8.0 J	BMDL J	U	UJ	7.0 J	5 J
Vinyl Chloride	10	10	939 J	U	U	UJ	UJ	UJ	UJ	16.2 J	12.5 J
trans-1,3-Dichloropropene	10	10	U	UJ	UJ	UJ	UJ	U	UJ	UJ	UJ

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number			SB309F1	SB309F2	SB310F1	SB310F1DUP	SB310F2	SB311F1	SB311F2	SB312F1	SB312F2
Laboratory Sample Number			HA1426	HA1427	HA1432	HA1413	HA1433	HA1166	HA1167	HA1149	HA1148
Sampling Date			9/27/93	9/27/93	9/27/93	9/27/93	9/27/93	9/26/93	9/26/93	9/25/93	9/25/93
Dilution Factor			1.2	1.1	11.4	1.1	1.2	1.2	1.1	2.9	2.8
Units	Quant Limit (ug/L)	Quant Limit (ug/Kg)	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
PRIORITY POLLUTANT ACID EXTRACTABLE COMPOUNDS											
2-Chlorophenol	3.9	340	UJ	U	U	U	U	U	U	U	U
2,4-Dichlorophenol	3.2	280	25000	U	U	U	U	U	U	U	U
2,4-Dimethylphenol	3.2	280	U	U	U	U	U	U	U	U	U
4,6-Dinitro-2-methylphenol	29	2400	UJ	U	U	UJ	U	U	U	U	U
2,4-Dinitrophenol	50	4300	UJ	U	UJ	UJ	UJ	UJ	UJ	U	U
2-Nitrophenol	4.3	370	U	U	U	U	U	U	U	U	U
4-Nitrophenol	2.9	240	UJ	U	U	U	U	U	U	1370	U
4-Chloro-3-methylphenol	3.6	310	UJ	U	U	U	U	U	U	U	U
Pentachlorophenol	4.3	370	UJ	UJ	UJ	U	UJ	U	UJ	U	U
Phenol	1.8	150	8630 J	U	U	U	U	U	U	U	U
2,4,6-Trichlorophenol	3.2	280	1300 J	U	U	U	U	U	U	U	U

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number Laboratory Sample Number Sampling Date Dilution Factor Units	Quant Limit ug/L	Quant Limit ug/Kg	SB309F1 HA1426 9/27/93 1.2 ug/Kg	SB309F2 HA1427 9/27/93 1.1 ug/Kg	SB310F1 HA1432 9/27/93 11.4 ug/Kg	SB310F1DUP HA1413 9/27/93 1.1 ug/Kg	SB310F2 HA1433 9/27/93 1.2	SB311F1 HA1166 9/26/93 1.2 ug/Kg	SB311F2 HA1167 9/26/93 1.1 ug/Kg	SB312F1 HA1149 9/25/93 2.9 ug/Kg	SB312F2 HA1148 9/25/93 2.8 ug/Kg
PRIORITY POLLUTANT BASE/NEUTRAL EXTRACTABLE COMPOUNDS											
Acenaphthene	2.3	220	473 J	U	7780	1200	BMDL	804	U	392 J	U
Acenaphthylene	4.2	410	UJ	U	U	U	U	U	U	U	U
Anthracene	2.3	220	678 J	U	19200	2680	288	1720	170 J	605	U
Benzo(a)anthracene	9.3	910	1790	U	28000	6630	BMDL	3600	U	1234 J	504 J
Benzo(a)pyrene	3.0	290	1510	U	25800	4090	691	2830	UJ	1380	452 J
Benzo(b)fluoranthene	5.7	560	2440	U	22400	5800	643	2920	UJ	2350	798 J
Benzo(g,h,i)perylene	4.9	480	1270	U	14700	4120	783	1870	UJ	991 J	U
Benzo(k)fluoranthene	3.0	290	1270	U	17700	3700	455	1520	UJ	U	U
bis(2-Chloroethoxy)methane	6.3	620	1060	U	U	U	U	U	U	U	U
Bis(2-chloroethyl) ether	6.8	660	UJ	U	U	U	U	U	U	U	U
bis(2-chloroisopropyl) ether	6.8	660	U	U	U	U	U	U	U	U	U
bis(2-Ethylhexyl)phthalate	12	1200	U	U	U	U	U	1920	U	985 JB	370 JB
4-Bromophenylphenyl ether	2.3	220	UJ	U	U	U	U	U	U	U	U
Butylbenzylphthalate	12	1200	U	U	U	U	U	U	U	U	U
2-Chloronaphthalene	2.3	220	UJ	U	U	U	U	U	U	U	U
4-Chlorophenylphenyl ether	5.0	490	UJ	U	U	U	U	U	U	U	U
Chrysene	3.0	290	1990	U	27700	6140	719	3780	U	1370	484 J
Dibenz(a,h)anthracene	3.0	290	U	U	U	BMDL	U	687 J	UJ	U	U
1,2-Dichlorobenzene	2.3	220	794 J	U	U	U	U	U	U	U	U
1,3-Dichlorobenzene	2.3	220	UJ	U	U	U	U	U	U	U	U
1,4-Dichlorobenzene	5.2	510	BMDL J	U	U	U	U	U	U	U	U
3,3'-Dichlorobenzidine	19.6	1920	UJ	U	U	U	U	U	U	U	U
Diethylphthalate	12	1200	UJ	U	U	U	U	U	U	U	U
Dimethylphthalate	12	1200	UJ	U	U	U	U	U	U	U	U
Di-n-butylphthalate	12	1200	UJ	U	U	U	U	U	U	1054 J	U
2,4-Dinitrotoluene	6.8	660	UJ	U	U	U	U	U	U	U	U
2,6-Dinitrotoluene	2.3	220	UJ	U	U	U	U	U	U	U	U
Di-n-octylphthalate	12	1200	U	U	U	U	U	U	UJ	U	U
Fluoranthene	2.6	260	2160	U	42400	15000	1250	4930	478 J	2650	1210
Fluorene	2.3	220	692	U	11200	1470	BMDL	1190	U	434 J	U
Hexachlorobenzene	2.3	220	11200	U	U	U	U	U	U	U	U
Hexachlorobutadiene	1.1	100	U	U	U	U	U	U	U	U	U
Hexachlorocyclopentadiene	12	1200	UJ	U	U	U	U	U	U	UJ	UJ
Hexachloroethane	1.9	190	UJ	U	U	U	U	U	U	U	U
Indeno(1,2,3-cd)pyrene	4.4	430	BMDL	U	BMDL	1700	BMDL	800	UJ	362 J	U
Isophorone	2.6	260	BMDL	U	U	U	U	U	U	U	U
Naphthalene	1.9	190	2320	U	10300	1550	706	1600	U	U	U
Nitrobenzene	2.3	220	U	U	U	U	U	U	155 J	U	U
N-Nitroso-dimethylamine	12	1200	U	U	U	U	U	U	U	U	U
N-Nitroso-di-n-propylamine	12	1200	U	U	U	U	U	U	U	U	U
N-Nitroso-diphenylamine	2.3	220	U	U	U	U	U	U	U	U	U
Phenanthrene	6.4	630	4040	BMDL	82100	11700	1290	8350	761	2880	1287 J
Pyrene	2.3	220	1990	UJ	30700 J	12600	1040 J	4080	363 J	2160	968
1,2,4-Trichlorobenzene	2.3	220	U	U	U	U	U	U	U	U	U

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TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number			SB309F1	SB309F2	SB310F1	SB310F1DUP	SB310F2	SB311F1	SB311F2	SB312F1	SB312F2
Laboratory Sample Number			HA1426	HA1427	HA1432	HA1413	HA1433	HA1166	HA1167	HA1149	HA1148
Sampling Date	Quant	Quant	9/27/93	9/27/93	9/27/93	9/27/93	9/27/93	9/26/93	9/26/93	9/25/93	9/25/93
Dilution Factor	Limit	Limit	350	3500	175	175	180	358	175	3.6	3.6
Units	ug/L	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
PESTICIDES											
Aldrin	0.05	1.7	U	U	U	U	U	U	U	U	U
Alpha-BHC	0.05	1.7	U	U	U	U	U	U	U	U	U
Beta-BHC	0.05	1.7	U	U	U	U	U	U	U	U	U
Gamma-BHC (Lindane)	0.05	1.7	U	U	U	U	U	U	U	U	U
Delta-BHC	0.05	1.7	U	U	U	U	U	U	U	U	U
Chlordane	1.0	33	U	U	U	U	U	U	U	U	U
4,4'-DDT	0.10	3.3	U	U	U	U	U	U	U	U	U
4,4'-DDE	0.10	3.3	U	U	U	U	U	U	U	U	U
4,4'-DDD	2.5	83	U	U	U	U	U	U	U	U	U
Dieldrin	0.10	3.3	U	U	U	U	U	U	U	U	U
Endosulfan I	0.05	1.7	U	U	U	U	U	U	U	U	U
Endosulfan II	0.10	3.3	U	U	U	U	U	U	U	U	U
Endosulfan Sulfate	0.10	3.3	U	U	U	U	U	U	U	U	U
Endrin	0.10	3.3	U	U	U	U	U	U	U	U	U
Endrin Aldehyde	0.10	3.3	U	U	U	U	U	U	U	U	U
Heptachlor	0.05	1.7	U	U	U	U	U	U	U	U	U
Heptachlor Epoxide	0.05	1.7	U	U	U	U	U	U	U	U	U
Toxaphene	2.0	65	U	U	U	U	U	U	U	U	U
Arochlor-1016	0.55	18	U	U	U	U	U	U	U	U	U
Arochlor-1221	0.55	18	U	U	U	U	U	U	U	U	U
Arochlor-1232	0.55	18	U	U	U	U	U	U	U	U	U
Arochlor-1242	0.55	18	U	U	U	U	U	U	U	U	U
Arochlor-1248	0.55	18	U	U	U	U	U	U	U	U	U
Arochlor-1254	1.0	33	U	U	U	U	U	U	U	U	U
Arochlor-1260	1.0	33	U	U	U	U	U	U	U	U	U

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TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number	Quant Limit	Quant Limit	SB320F1	SB320F2	SB321F1	SB321F2	SB325F1	SB325F2	SB326F1	SB326F1DUP	SB326F2	SB326F2DUP
Laboratory Sample Number	ug/L	ug/Kg	HA1143	HA1412	HA1476	HA1477	HA1430	HA1431	HA1418	HA1419	HA1424	HA1425
Sampling Date			9/26/93	9/27/93	9/26/93	9/26/93	9/27/93	9/27/93	9/27/93	9/27/93	9/27/93	9/27/93
Units	ug/L	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
PRIORITY POLLUTANT INORGANIC PARAMETERS (METALS)												
Antimony	60	6000	BMDL J	12000 J	9300	9300	11000	7800	BMDL J	17000 J	BMDL J	BMDL J
Arsenic	10	1000	12000 J	10000	18000	9000	5500	5800	7000 J	4700 J	5400	6500 J
Beryllium	1.0	100	570	590 J	430	340	690	510	330	320	270 J	500 J
Cadmium	2.0	200	2100	UJ	U	U	260	U	U	U	UJ	BMDL J
Chromium	10	1000	18000 J	19000	15000	14000	50000	32000	49000	50000	11000	17000
Copper	10	1000	34000 J	37000	27000	21000	42000	82000	20000	23000	21000	27000
Lead	5.0	500	33000 J	36000 J	25000	14000	280000	76000	90000	110000	25000	25000
Mercury	0.20	80	400 J	130	150	BMDL J	230	BMDL J	140	110	BMDL J	BMDL J
Nickel	20	1000	30000 J	36000 J	25000	24000	21000	28000	10000	12000	20000	27000
Selenium	5.0	500	U	BMDL J	U	BMDL J	BMDL J	UJ	BMDL J	BMDL J	UJ	BMDL J
Silver	10	1000	2700	U	U	U	U	U	U	U	U	U
Thallium	10	1000	BMDL J	BMDL J	BMDL J	BMDL J	U	U	U	U	UJ	BMDL J
Zinc	20	2000	100000 J	120000 J	73000	53000	268000	230000	110000	120000	40000 J	89000 J
	mg/L	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg
Cyanide, total	0.010	0.5	U	U	U	U	U	U	U	U	U	U
Phenols, total	0.10	3.0	U	U	U	U	U	U	U	U	U	U

LEGEND:

- U Compound was not detected at laboratory method detection limit.
  - J Estimated value due to limitations identified during the quality assurance review.
  - UJ eported method detection limit is estimated due to limitations identified during the quality assurance review.
  - B Compound was detected in a laboratory and/or field blank at similar concentrations. May represent laboratory and/or field contamination.
  - R Unreliable result. Compound may or may not be present.
  - \* Sample analyzed at multiple dilutions. Summary table is a hybrid of diluted and undiluted results.
  - No standard available. Compound was qualitatively searched for.
  - NA Not analyzed
  - NP Not provided
  - IND Indeterminate. Standard and/or spikes could not be detected at method detection limit.
  - BMDL Below Method Detection Limit reported by laboratory.
- Discrepancies may exist between the laboratory data tables and the data validation summary tables due to variations in the rounding of calculations.

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number	Quant	Quant	SB320F1	SB320F2	SB321F1	SB321F2	SB325F1	SB325F2	SB326F1	SB326F1DUP	SB326F2	SB326F2DUP
Laboratory Sample Number	Limit	Limit	HA1143	HA1412	HA1476	HA1477	HA1430	HA1431	HA1418	HA1419	HA1424	HA1425
Sampling Date	(ug/L)	(ug/Kg)	9/26/93	9/27/93	9/26/93	9/26/93	9/27/93	9/27/93	9/27/93	9/27/93	9/27/93	9/27/93
Dilution Factor	1.0	1.0	1.0	1.0	2.5	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Units	ug/L	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
PRIORITY POLLUTANT P/T VOLATILE COMPOUNDS												
Benzene	4.4	4.4	2 J	UJ	10 J	UJ	5.63 J	5.33 J	6.16 J	6.54 J	UJ	2.9 JB
Bromoform	4.7	4.7	U	UJ	U	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Carbon Tetrachloride	2.8	2.8	U	UJ	U	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Chlorobenzene	6.0	6.0	U	UJ	10 J	UJ	UJ	UJ	5.0 J	8.62 J	UJ	UJ
Chlorodibromomethane	3.1	3.1	U	UJ	U	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Chloroethane	10	10	U	UJ	U	UJ	U	U	UJ	UJ	U	U
Chloroform	1.6	1.6	U	UJ	U	UJ	U	U	UJ	UJ	U	U
Dichlorobromomethane	2.2	2.2	U	UJ	U	UJ	U	U	UJ	UJ	U	UJ
Dichlorodifluoromethane	10	10	U	UJ	U	UJ	U	U	UJ	UJ	U	UJ
1,1-Dichloroethane	4.7	4.7	U	UJ	U	UJ	U	U	UJ	UJ	U	U
1,2-Dichloroethane	2.8	2.8	U	UJ	U	UJ	4.59	U	UJ	UJ	U	U
1,1-Dichloroethene	2.8	2.8	U	UJ	U	UJ	3.27	3.6	2.7 J	1.8 J	U	3.07
1,2-Dichloropropane	6.0	6.0	U	UJ	U	UJ	UJ	UJ	UJ	UJ	UJ	UJ
cis-1,3-Dichloropropene	5.0	5.0	U	UJ	U	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Ethylbenzene	7.2	7.2	U	UJ	U	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Methyl bromide	10	10	U	UJ	U	UJ	U	U	UJ	UJ	U	UJ
Methyl chloride	10	10	U	UJ	U	UJ	U	U	UJ	UJ	U	U
Methylene Chloride	2.8	2.8	30.5 JB	17.6 JB	42.5	30.9 JB	63.9 JB	70.8 J	46 JB	49.6 JB	54.8 JB	58.1 BJ
1,1,2,2-Tetrachloroethane	4.1	4.1	U	UJ	U	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Tetrachloroethene	4.1	4.1	U	UJ	U	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Toluene	6.0	6.0	U	UJ	9 J	3 J	6.3 J	6.3	5 J	8.81 J	UJ	UJ
1,2-Dichloroethene (trans)	1.6	1.6	U	UJ	U	UJ	UJ	UJ	UJ	UJ	UJ	U
1,1,1-Trichloroethane	3.8	3.8	U	UJ	U	UJ	UJ	UJ	UJ	UJ	UJ	UJ
1,1,2-Trichloroethane	5.0	5.0	U	UJ	34.1	UJ	44.3 J	15.2 J	18.4 J	32.8 J	U	UJ
Trichloroethene	1.9	1.9	U	UJ	U	UJ	UJ	UJ	UJ	UJ	U	UJ
Trichlorofluoromethane	10	10	U	UJ	U	UJ	7.3 J	U	2 J	2.2 J	UJ	7.4 J
Vinyl Chloride	10	10	U	UJ	U	UJ	U	U	UJ	UJ	U	UJ
trans-1,3-Dichloropropene	10	10	U	UJ	U	UJ	UJ	UJ	UJ	UJ	U	UJ

continued next page (see last page of table for notes)



TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number	Quant	Quant	SB320F1	SB320F2	SB321F1	SB321F2	SB325F1	SB325F2	SB326F1	SB326F1DUP	SB326F2	SB326F2DUP
Laboratory Sample Number	Limit	Limit	HA1143	HA1412	HA1476	HA1477	HA1430	HA1431	HA1418	HA1419	HA1424	HA1425
Sampling Date	(ug/L)	(ug/Kg)	9/26/93	9/27/93	9/26/93	9/26/93	9/27/93	9/27/93	9/27/93	9/27/93	9/27/93	9/27/93
Dilution Factor	1.3	1.1	1.1	1.3	6.5	1.1	11.5	10.9	1.2	1.1		
Units	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
PRIORITY POLLUTANT ACID EXTRACTABLE COMPOUNDS												
2-Chlorophenol	3.9	340	UJ	U	U	U	UJ	U	UJ	UJ	U	UJ
2,4-Dichlorophenol	3.2	280	UJ	U	816	U	UJ	U	UJ	UJ	U	UJ
2,4-Dimethylphenol	3.2	280	UJ	U	U	U	UJ	U	UJ	UJ	U	UJ
4,6-Dinitro-2-methylphenol	29	2400	UJ	U	U	U	UJ	U	UJ	UJ	U	UJ
2,4-Dinitrophenol	50	4300	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
2-Nitrophenol	4.3	370	UJ	U	U	U	UJ	U	UJ	UJ	U	UJ
4-Nitrophenol	2.9	240	727 J	561	3830	U	UJ	U	UJ	UJ	U	UJ
4-Chloro-3-methylphenol	3.6	310	UJ	U	U	U	UJ	U	UJ	UJ	U	UJ
Pentachlorophenol	4.3	370	UJ	UJ	U	UJ	UJ	U	UJ	UJ	UJ	UJ
Phenol	1.8	150	UJ	U	U	U	UJ	669	UJ	UJ	1020	673 J
2,4,6-Trichlorophenol	3.2	280	UJ	U	U	U	UJ	U	UJ	UJ	U	UJ

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number	Quant	Quant	SB320F1	SB320F2	SB321F1	SB321F2	SB325F1	SB325F2	SB326F1	SB326F1DUP	SB326F2	SB326F2DUP
Laboratory Sample Number	Limit	Limit	HA1143	HA1412	HA1476	HA1477	HA1430	HA1431	HA1418	HA1419	HA1424	HA1425
Sampling Date	ug/L	ug/Kg	9/26/93	9/27/93	9/26/93	9/26/93	9/27/93	9/27/93	9/27/93	9/27/93	9/27/93	9/27/93
Dilution Factor			1.3	1.1	1.1	1.3	6.5	1.1	11.5	10.9	1.2	1.1
Units	ug/L	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
PRIORITY POLLUTANT BASE/NEUTRAL EXTRACTABLE COMPOUNDS												
Acenaphthene	2.3	220	522 J	810	1150	154 J	UJ	U	3270 J	2710 J	BMDL	275 J
Acenaphthylene	4.2	410	UJ	U	U	U	BMDL J	327	UJ	UJ	U	UJ
Anthracene	2.3	220	1090 J	1870	3310	308	UJ	U	6150 J	4870 J	246	460 J
Benzo(a)anthracene	9.3	910	2030	4100	5020	UJ	3670	771	11700	U	U	U
Benzo(a)pyrene	3.0	290	2270	4040	3890	UJ	U	1500	8220	U	U	385
Benzo(b)fluoranthene	5.7	560	1770	4280	3270	UJ	U	1280	8590	U	U	BMDL
Benzo(g,h,i)perylene	4.9	480	U	2340	2200	UJ	U	1110	U	U	U	U
Benzo(k)fluoranthene	3.0	290	1930	2260	2830	UJ	U	849	5140	U	U	417
bis(2-Chloroethoxy)methane	6.3	620	UJ	U	U	U	UJ	887	UJ	UJ	U	UJ
Bis(2-chloroethyl) ether	6.8	660	UJ	U	U	U	UJ	U	UJ	UJ	U	UJ
bis(2-chloroisopropyl) ether	6.8	660	U	U	U	U	U	U	U	U	U	U
bis(2-Ethylhexyl)phthalate	12	1200	U	U	3340	UJ	U	U	UJ	UJ	2690	2380
4-Bromophenylphenyl ether	2.3	220	UJ	U	U	U	UJ	U	U	U	U	U
Butylbenzylphthalate	12	1200	U	U	U	UJ	U	U	U	U	U	U
2-Chloronaphthalene	2.3	220	UJ	U	U	U	UJ	U	UJ	UJ	U	UJ
4-Chlorophenylphenyl ether	5.0	490	UJ	U	U	U	UJ	U	UJ	UJ	U	UJ
Chrysene	3.0	290	2180	4050	4440	UJ	U	1440	10800	U	U	U
Dibenz(a,h)anthracene	3.0	290	U	U	636 J	UJ	U	U	U	U	U	U
1,2-Dichlorobenzene	2.3	220	UJ	U	U	U	U	U	U	U	U	U
1,3-Dichlorobenzene	2.3	220	UJ	U	U	U	U	U	U	U	U	U
1,4-Dichlorobenzene	5.2	510	UJ	U	U	U	UJ	U	UJ	UJ	U	UJ
3,3'-Dichlorobenzidine	19.6	1920	UJ	U	U	UJ	UJ	U	UJ	UJ	U	UJ
Diethylphthalate	12	1200	UJ	U	U	U	UJ	U	UJ	UJ	U	UJ
Dimethylphthalate	12	1200	UJ	U	U	U	UJ	U	UJ	UJ	U	UJ
Di-n-butylphthalate	12	1200	UJ	U	U	U	UJ	U	UJ	UJ	U	UJ
2,4-Dinitrotoluene	6.8	660	UJ	U	U	U	UJ	U	UJ	UJ	U	UJ
2,6-Dinitrotoluene	2.3	220	UJ	U	U	U	UJ	U	UJ	UJ	U	UJ
Di-n-octylphthalate	12	1200	U	U	U	UJ	U	U	U	U	U	U
Fluoranthene	2.6	260	4130 J	7280	9940	1450	12500 J	2470	17900 J	15300 J	598	957 J
Fluorene	2.3	220	651 J	968	1860	175 J	BMDL J	551	4340 J	3280 J	BMDL	384 J
Hexachlorobenzene	2.3	220	U	U	U	U	U	U	U	U	U	U
Hexachlorobutadiene	1.1	100	UJ	U	U	U	UJ	U	UJ	UJ	U	UJ
Hexachlorocyclopentadiene	12	1200	UJ	U	U	U	UJ	U	UJ	UJ	U	UJ
Hexachloroethane	1.9	190	UJ	U	U	U	UJ	U	UJ	UJ	U	UJ
Indeno(1,2,3-cd)pyrene	4.4	430	U	962	983	UJ	U	BMDL	U	U	U	U
Isophorone	2.6	260	UJ	U	U	U	UJ	U	UJ	UJ	U	UJ
Naphthalene	1.9	190	864 J	625	889	180 J	BMDL J	535	5540	4320	256	526
Nitrobenzene	2.3	220	UJ	U	U	U	UJ	U	UJ	UJ	U	UJ
N-Nitroso--dimethylamine	12	1200	U	U	U	U	U	U	U	U	U	U
N-Nitroso--di-n-propylamine	12	1200	UJ	U	U	U	UJ	U	UJ	UJ	U	UJ
N-Nitroso--diphenylamine	2.3	220	UJ	U	U	U	UJ	U	UJ	UJ	U	UJ
Phenanthrene	6.4	630	4670	7980	10200	1280	14500	3730	21100	18400	973	1950
Pyrene	2.3	220	2810	5060 J	7630	1060 J	9210	1900	13200	10400	412 J	681
1,2,4-Trichlorobenzene	2.3	220	UJ	U	U	U	UJ	U	UJ	UJ	U	UJ

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number			SB320F1	SB320F2	SB321F1	SB321F2	SB325F1	SB325F2	SB326F1	SB326F1DUP	SB326F2	SB326F2DUP
Laboratory Sample Number			HA1143	HA1412	HA1476	HA1477	HA1430	HA1431	HA1418	HA1419	HA1424	HA1425
Sampling Date	Quant	Quant	9/26/93	9/27/93	9/26/93	9/26/93	9/27/93	9/27/93	9/27/93	9/27/93	9/27/93	9/27/93
Dilution Factor	Limit	Limit	2000	175	175	190	345	175	1775	1700	175	175
Units	ug/L	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
PESTICIDES												
Aldrin	0.05	1.7	U	U	U	U	U	U	U	U	U	U
Alpha-BHC	0.05	1.7	U	U	U	U	U	U	U	U	U	U
Beta-BHC	0.05	1.7	U	U	U	U	U	U	U	U	U	U
Gamma-BHC (Lindane)	0.05	1.7	U	U	U	U	U	U	U	U	U	U
Delta-BHC	0.05	1.7	U	U	U	U	U	U	U	U	U	U
Chlordane	1.0	33	U	1530	U	U	U	U	U	U	U	U
4,4'-DDT	0.10	3.3	U	U	U	U	U	U	U	U	U	U
4,4'-DDE	0.10	3.3	U	U	U	U	U	U	U	U	U	U
4,4'-DDD	2.5	83	U	U	U	U	U	U	U	U	U	U
Dieldrin	0.10	3.3	U	U	U	U	U	U	U	U	U	U
Endosulfan I	0.05	1.7	U	U	U	U	U	U	U	U	U	U
Endosulfan II	0.10	3.3	U	U	U	U	U	U	U	U	U	U
Endosulfan Sulfate	0.10	3.3	U	U	U	U	U	U	U	U	U	U
Endrin	0.10	3.3	U	U	U	U	U	U	U	U	U	U
Endrin Aldehyde	0.10	3.3	U	U	U	U	U	U	U	U	U	U
Heptachlor	0.05	1.7	U	U	U	U	U	U	U	U	U	U
Heptachlor Epoxide	0.05	1.7	U	U	U	U	U	U	U	U	U	U
Toxaphene	2.0	65	U	U	U	U	U	U	U	U	U	U
Arochlor-1016	0.55	18	U	U	U	U	U	U	U	U	U	U
Arochlor-1221	0.55	18	U	U	U	U	U	U	U	U	U	U
Arochlor-1232	0.55	18	U	U	U	U	U	U	U	U	U	U
Arochlor-1242	0.55	18	U	U	U	U	U	U	U	U	U	U
Arochlor-1248	0.55	18	U	U	U	U	U	U	U	U	U	U
Arochlor-1254	1.0	33	U	U	U	U	U	U	U	U	U	U
Arochlor-1260	1.0	33	U	U	U	U	U	U	U	U	U	U

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number	Quant	Quant	SB320F1	SB320F2	SB321F1	SB321F2	SB325F1	SB325F2	SB326F1	SB326F1DUP	SB326F2	SB326F2DUP
Laboratory Sample Number	Limit	Limit	HA1143	HA1412	HA1476	HA1477	HA1430	HA1431	HA1418	HA1419	HA1424	HA1425
Sampling Date	ug/L	ug/Kg	9/26/93	9/27/93	9/26/93	9/26/93	9/27/93	9/27/93	9/27/93	9/27/93	9/27/93	9/27/93
Units	ug/L	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
PRIORITY POLLUTANT INORGANIC PARAMETERS (METALS)												
Antimony	60	6000	BMDL J	12000 J	9300	9300	11000	7800	BMDL J	17000 J	BMDL J	BMDL J
Arsenic	10	1000	12000 J	10000	18000	9000	5500	5800	7000 J	4700 J	5400	6500 J
Beryllium	1.0	100	570	590 J	430	340	690	510	330	320	270 J	500 J
Cadmium	2.0	200	2100	UJ	U	U	260	U	U	U	UJ	BMDL J
Chromium	10	1000	18000 J	19000	15000	14000	50000	32000	49000	50000	11000	17000
Copper	10	1000	34000 J	37000	27000	21000	42000	82000	20000	23000	21000	27000
Lead	5.0	500	33000 J	36000 J	25000	14000	280000	76000	90000	110000	25000	25000
Mercury	0.20	80	400 J	130	150	BMDL J	230	BMDL J	140	110	BMDL J	BMDL J
Nickel	20	1000	30000 J	36000 J	25000	24000	21000	28000	10000	12000	20000	27000
Selenium	5.0	500	U	BMDL J	U	BMDL J	BMDL J	UJ	BMDL J	BMDL J	UJ	BMDL J
Silver	10	1000	2700	U	U	U	U	U	U	U	U	U
Thallium	10	1000	BMDL J	BMDL J	BMDL J	BMDL J	U	U	U	U	UJ	BMDL J
Zinc	20	2000	100000 J	12000	73000	53000	268000	230000	110000	120000	40000 J	89000 J
	mg/L	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg
Cyanide, total	0.010	0.5	U	U	U	U	U	U	U	U	U	U
Phenols, total	0.10	3.0	U	U	U	U	U	U	U	U	U	U

LEGEND:

- U Compound was not detected at laboratory method detection limit.
  - J Estimated value due to limitations identified during the quality assurance review.
  - UJ eported method detection limit is estimated due to limitations identified during the quality assurance review.
  - B Compound was detected in a laboratory and/or field blank at similar concentrations. May represent laboratory and/or field contamination.
  - R Unreliable result. Compound may or may not be present.
  - \* Sample analyzed at multiple dilutions. Summary table is a hybrid of diluted and undiluted results.
  - No standard available. Compound was qualitatively searched for.
  - NA Not analyzed
  - NP Not provided
  - IND Indeterminate. Standard and/or spikes could not be detected at method detection limit.
  - BMDL Below Method Detection Limit reported by laboratory.
- Discrepancies may exist between the laboratory data tables and the data validation summary tables due to variations in the rounding of calculations.

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number Laboratory Sample Number Sampling Date Dilution Factor Units	Quant Limit (ug/L)	Quant Limit (ug/Kg)	SB327F1 HA1147 9/26/93 1.0 ug/Kg	SB327F2 HA1146 9/26/93 1.0 ug/Kg	SB328F1 HA1175 9/25/93 1.0 ug/Kg	SB328F2 HA1174 9/25/93 1.0 ug/Kg	SB329F1 HA1145 9/25/93 5.0 ug/Kg	SB329F2 HA1180 9/25/93 2.0 ug/Kg	SB329F2DUP HA1181 9/25/93 1.0 ug/Kg	SB338F1 HA1162 9/26/93 1.0 ug/Kg	SB338F2 HA1163 9/26/93 1.0 ug/Kg
PRIORITY POLLUTANT P/T VOLATILE COMPOUNDS											
Benzene	4.4	4.4	6.37 J	UJ	3 J	5.04 J	8 J	1 J	2 J	5.49 J	UJ
Bromoform	4.7	4.7	UJ	UJ	UJ	UJ	U	U	UJ	UJ	UJ
Carbon Tetrachloride	2.8	2.8	UJ	UJ	UJ	UJ	UJ	U	UJ	UJ	UJ
Chlorobenzene	6.0	6.0	UJ	UJ	UJ	UJ	U	U	UJ	UJ	UJ
Chlorodibromomethane	3.1	3.1	UJ	UJ	UJ	UJ	U	U	UJ	UJ	UJ
Chloroethane	10	10	UJ	UJ	UJ	UJ	U	U	UJ	UJ	UJ
Chloroform	1.6	1.6	UJ	UJ	UJ	1 J	4 JB	U	UJ	UJ	UJ
Dichlorobromomethane	2.2	2.2	UJ	UJ	UJ	UJ	U	U	UJ	UJ	UJ
Dichlorodifluoromethane	10	10	UJ	UJ	UJ	UJ	U	U	UJ	UJ	UJ
1,1-Dichloroethane	4.7	4.7	UJ	UJ	UJ	UJ	U	U	UJ	UJ	UJ
1,2-Dichloroethane	2.8	2.8	UJ	UJ	UJ	UJ	U	U	UJ	UJ	UJ
1,1-Dichloroethene	2.8	2.8	UJ	UJ	1 J	9.12 J	12 J	3 J	4.43 J	15.4 J	UJ
1,2-Dichloropropane	6.0	6.0	UJ	UJ	UJ	UJ	U	U	UJ	UJ	UJ
cis-1,3-Dichloropropene	5.0	5.0	UJ	UJ	UJ	UJ	U	U	UJ	UJ	UJ
Ethylbenzene	7.2	7.2	UJ	UJ	1 J	2 J	U	U	UJ	UJ	UJ
Methyl bromide	10	10	UJ	UJ	UJ	UJ	U	U	UJ	UJ	UJ
Methyl chloride	10	10	UJ	UJ	UJ	UJ	U	U	UJ	UJ	UJ
Methylene Chloride	2.8	2.8	62.8 JB	32.8	49.3 JB	275 J	290 JB	149 JB	262 J	330 J	19.6 JB
1,1,2,2-Tetrachloroethane	4.1	4.1	UJ	UJ	UJ	UJ	U	U	UJ	UJ	UJ
Tetrachloroethene	4.1	4.1	UJ	UJ	UJ	UJ	U	U	UJ	UJ	UJ
Toluene	6.0	6.0	UJ	UJ	3 J	4 J	4 J	U	UJ	4 J	UJ
1,2-Dichloroethene (trans)	1.6	1.6	UJ	3 J	UJ	3.02 J	U	U	UJ	UJ	UJ
1,1,1-Trichloroethane	3.8	3.8	UJ	UJ	1 J	UJ	UJ	U	UJ	UJ	UJ
1,1,2-Trichloroethane	5.0	5.0	10.4 J	UJ	5 JB	41.9 J	207	35.4	18.7 J	51.5 J	5.80 J
Trichloroethene	1.9	1.9	UJ	3 J	3.59 J	3.97 J	U	U	UJ	UJ	UJ
Trichlorofluoromethane	10	10	UJ	UJ	UJ	2 J	UJ	UJ	10.2 J	28.5 J	UJ
Vinyl Chloride	10	10	UJ	2 J	UJ	13.9 J	U	UJ	10.0 J	UJ	UJ
trans-1,3-Dichloropropene	10	10	UJ	UJ	UJ	UJ	UJ	U	UJ	UJ	UJ

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number Laboratory Sample Number Sampling Date Dilution Factor Units	Quant Limit (ug/L)	Quant Limit (ug/Kg)	SB327F1 HA1147 9/26/93 1.1 ug/Kg	SB327F2 HA1148 9/26/93 1.2 ug/Kg	SB328F1 HA1175 9/25/93 2.1 ug/Kg	SB328F2 HA1174 9/25/93 2.0 ug/Kg	SB329F1 HA1145 9/25/93 2.8 ug/Kg	SB329F2 HA1180 9/25/93 2.4 ug/Kg	SB329F2DUP HA1181 9/25/93 2.9 ug/Kg	SB338F1 HA1182 9/26/93 1.1 ug/Kg	SB338F2 HA1163 9/26/93 1.2 ug/Kg
PRIORITY POLLUTANT ACID EXTRACTABLE COMPOUNDS											
2-Chlorophenol	3.9	340	U	U	U	U	U	U	U	U	U
2,4-Dichlorophenol	3.2	280	U	U	U	U	U	U	U	U	U
2,4-Dimethylphenol	3.2	280	U	U	U	U	U	U	U	U	U
4,6-Dinitro-2-methylphenol	29	2400	U	U	UJ	U	U	U	U	U	U
2,4-Dinitrophenol	50	4300	UJ	UJ	U	U	U	U	U	UJ	UJ
2-Nitrophenol	4.3	370	U	U	U	U	U	U	U	U	U
4-Nitrophenol	2.9	240	U	U	U	U	U	U	U	U	U
4-Chloro-3-methylphenol	3.6	310	U	U	U	U	U	U	U	U	U
Pentachlorophenol	4.3	370	U	UJ	UJ	U	U	U	U	UJ	UJ
Phenol	1.8	150	767	503	U	U	U	U	U	U	U
2,4,6-Trichlorophenol	3.2	280	U	U	U	U	U	U	U	U	U

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number			SB327F1	SB327F2	SB328F1	SB328F2	SB329F1	SB329F2	SB329F2DUP	SB338F1	SB338F2
Laboratory Sample Number			HA1147	HA1146	HA1175	HA1174	HA1145	HA1180	HA1181	HA1162	HA1163
Sampling Date	Quant	Quant	9/26/93	9/26/93	9/25/93	9/25/93	9/25/93	9/25/93	9/25/93	9/26/93	9/26/93
Dilution Factor	Limit	Limit	1.1	1.2	2.1	2.0	2.8	2.4	2.9	1.1	1.2
Units	ug/L	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
PRIORITY POLLUTANT BASE/NEUTRAL EXTRACTABLE COMPOUNDS											
Acenaphthene	2.3	220	670	261	500	262 J	1120	520	566 J	U	1050
Acenaphthylene	4.2	410	U	U	U	U	U	U	U	U	U
Anthracene	2.3	220	636	543	722	316 J	1970	854	809	U	1830
Benzo(a)anthracene	9.3	910	1170 J	868 J	1218 J	829 J	4140	1295 J	1284 J	U	2270
Benzo(a)pyrene	3.0	290	UJ	733	1030	925 J	1280	1140	1010 J	U	2110
Benzo(b)fluoranthene	5.7	560	UJ	928	1630	648 J	6650	2000	1690 J	U	1600
Benzo(g,h,i)perylene	4.9	480	UJ	U	588 J	U	607 J	U	UJ	U	1030
Benzo(k)fluoranthene	3.0	290	UJ	507	222 J	U	3600	U	UJ	U	1300
bis(2-Chloroethoxy)methane	6.3	620	U	U	U	U	U	U	U	U	U
Bis(2-chloroethyl) ether	6.8	660	U	U	U	U	U	U	U	U	U
bis(2-chloroisopropyl) ether	6.8	660	U	U	R	R	R	R	R	U	U
bis(2-Ethylhexyl)phthalate	12	1200	UJ	U	379 JB	874 JB	911 JB	460 JB	822 JB	U	U
4-Bromophenylphenyl ether	2.3	220	U	U	U	UJ	U	U	U	U	U
Butylbenzylphthalate	12	1200	UJ	U	U	UJ	U	U	UJ	U	U
2-Chloronaphthalene	2.3	220	U	U	U	U	U	U	U	U	U
4-Chlorophenylphenyl ether	5.0	490	U	U	U	U	4130	1390	U	U	U
Chrysene	3.0	290	1310 J	846	1100	806 J	765 J	U	1220 J	U	2260
Dibenz(a,h)anthracene	3.0	290	UJ	U	U	UJ	U	U	UJ	U	U
1,2-Dichlorobenzene	2.3	220	U	U	U	U	U	U	U	U	U
1,3-Dichlorobenzene	2.3	220	U	U	U	U	U	U	U	U	U
1,4-Dichlorobenzene	5.2	510	U	U	U	U	U	U	U	U	U
3,3'-Dichlorobenzidine	19.6	1920	UJ	U	U	UJ	U	U	UJ	U	U
Diethylphthalate	12	1200	U	U	U	U	U	U	U	U	U
Dimethylphthalate	12	1200	U	U	U	U	U	U	U	U	U
Di-n-butylphthalate	12	1200	U	U	579 JB	1352 JB	2235 J	765 JB	1991 JB	316 JB	U
2,4-Dinitrotoluene	6.8	660	U	U	U	U	U	U	U	U	U
2,6-Dinitrotoluene	2.3	220	U	U	U	U	U	U	U	U	U
Di-n-octylphthalate	12	1200	UJ	U	U	UJ	768 J	U	UJ	U	U
Fluoranthene	2.6	260	1110	1620	2960	1430 J	9300	3000	2930	247 J	3420
Fluorene	2.3	220	961	322	791	230 J	1440	755	753	U	1400
Hexachlorobenzene	2.3	220	U	U	U	UJ	U	U	U	U	U
Hexachlorobutadiene	1.1	100	U	U	U	U	U	U	U	U	U
Hexachlorocyclopentadiene	12	1200	U	U	UJ	UJ	UJ	UJ	UJ	U	U
Hexachloroethane	1.9	190	U	U	U	U	U	U	U	U	U
Indeno(1,2,3-cd)pyrene	4.4	430	UJ	U	238 J	232 J	1252 J	282 J	UJ	U	398 J
Isophorone	2.6	260	U	U	U	U	U	U	U	U	U
Naphthalene	1.9	190	1670	469	1040	U	3740	U	1270	U	2950
Nitrobenzene	2.3	220	U	U	U	U	U	U	U	U	U
N-Nitroso-dimethylamine	12	1200	U	U	U	U	U	U	U	U	U
N-Nitroso-di-n-propylamine	12	1200	U	U	U	U	U	U	U	U	U
N-Nitroso-diphenylamine	2.3	220	U	U	U	UJ	U	U	U	U	U
Phenanthrene	6.4	630	3770	2270	4020	1510 J	9110	4000	3930	406 J	8350
Pyrene	2.3	220	752 J	1130 J	2640	1460 J	7440	2310	2340 J	162 J	2750 J
1,2,4-Trichlorobenzene	2.3	220	U	U	U	U	U	U	U	U	U

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TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number			SB327F1	SB327F2	SB328F1	SB328F2	SB329F1	SB329F2	SB329F2DUP	SB338F1	SB338F2
Laboratory Sample Number			HA1147	HA1146	HA1175	HA1174	HA1145	HA1180	HA1181	HA1162	HA1163
Sampling Date	Quant	Quant	9/26/93	9/26/93	9/25/93	9/25/93	9/25/93	9/25/93	9/25/93	9/26/93	9/26/93
Dilution Factor	Limit	Limit	350	175	3.6	35.9	2.9	175	36.4	170	182
Units	ug/L	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
PESTICIDES											
Aldrin	0.05	1.7	U	U	U	U	U	U	U	U	U
Alpha-BHC	0.05	1.7	U	U	U	205	U	U	U	U	U
Beta-BHC	0.05	1.7	U	U	U	U	U	U	U	U	U
Gamma-BHC (Lindane)	0.05	1.7	U	U	U	U	U	U	U	U	U
Delta-BHC	0.05	1.7	U	U	U	U	U	U	U	U	U
Chlordane	1.0	33	U	U	U	U	U	U	U	U	U
4,4'-DDT	0.10	3.3	U	U	U	U	U	U	U	U	U
4,4'-DDE	0.10	3.3	U	U	U	U	U	U	U	U	U
4,4'-DDD	2.5	83	U	U	U	U	20.0	U	U	U	U
Dieldrin	0.10	3.3	U	U	U	U	U	U	U	U	U
Endosulfan I	0.05	1.7	U	U	U	U	U	U	U	U	U
Endosulfan II	0.10	3.3	U	U	U	U	U	U	U	U	U
Endosulfan Sulfate	0.10	3.3	U	U	U	U	U	U	U	U	U
Endrin	0.10	3.3	U	U	U	U	U	U	U	U	U
Endrin Aldehyde	0.10	3.3	U	U	U	U	U	U	U	U	U
Heptachlor	0.05	1.7	U	U	U	U	U	U	U	U	U
Heptachlor Epoxide	0.05	1.7	U	U	U	U	U	U	U	U	U
Toxaphene	2.0	65	U	U	U	U	U	U	U	U	U
Arochlor-1016	0.55	18	U	U	U	U	U	U	U	U	U
Arochlor-1221	0.55	18	U	U	U	U	U	U	U	U	U
Arochlor-1232	0.55	18	U	U	U	U	U	U	U	U	U
Arochlor-1242	0.55	18	U	U	U	U	U	U	U	U	U
Arochlor-1248	0.55	18	U	U	U	U	U	U	U	U	U
Arochlor-1254	1.0	33	U	U	U	U	U	U	U	U	U
Arochlor-1260	1.0	33	U	U	U	U	U	U	U	U	U

continued next page (see last page of table for notes)



TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number Laboratory Sample Number Sampling Date Units	Quant Limit ug/L	Quant Limit ug/Kg	SB327F1 HA1147 9/26/93 ug/Kg	SB327F2 HA1146 9/26/93 ug/Kg	SB328F1 HA1175 9/25/93 ug/Kg	SB328F2 HA1174 9/25/93 ug/Kg	SB329F1 HA1145 9/25/93 ug/Kg	SB329F2 HA1180 9/25/93 ug/Kg	SB329F2DUP HA1181 9/25/93 ug/Kg	SB338F1 HA1162 9/26/93 ug/Kg	SB338F2 HA1163 9/26/93 ug/Kg
PRIORITY POLLUTANT INORGANIC PARAMETERS (METALS)											
Antimony	60	6000	13000	9000	U	U	R	U	U	9300	12000
Arsenic	10	1000	5700	6500	3700	5900	11000	9200	6500	8000	6600
Beryllium	1.0	100	430	450	330	350	340	490	410	340	510
Cadmium	2.0	200	U	U	U	U	UJ	U	U	U	U
Chromium	10	1000	16000	16000	14000	13000	11000	14000	12000	13000	19000
Copper	10	1000	30000	34000	31000	30000	42000 J	56000	22000	35000	32000
Lead	5.0	500	33000	100000	32000	32000	130000 J	220000	59000	53000	30000
Mercury	0.20	80	120	160	BMDL J	BMDL J	BMDL J	98	170	230	BMDL J
Nickel	20	1000	30000	24000	34000	31000	25000	28000	20000	27000	34000
Selenium	5.0	500	BMDL J	BMDL J	U	U	BMDL J	BMDL J	BMDL J	BMDL J	BMDL J
Silver	10	1000	U	U	BMDL J	BMDL J	U	BMDL J	BMDL J	U	U
Thallium	10	1000	U	BMDL J	BMDL J	BMDL J	BMDL J	BMDL J	BMDL J	BMDL J	BMDL J
Zinc	20	2000	60000	98000	71000	48000	120000	230000	84000	120000	63000
	mg/L	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg
Cyanide, total	0.010	0.5	U	U	U	U	U	U	U	U	U
Phenols, total	0.10	3.0	U	U	U	U	U	U	U	U	U

LEGEND:

- U Compound was not detected at laboratory method detection limit.
  - J Estimated value due to limitations identified during the quality assurance review.
  - UJ eported method detection limit is estimated due to limitations identified during the quality assurance review.
  - B Compound was detected in a laboratory and/or field blank at similar concentrations. May represent laboratory and/or field contamination.
  - R Unreliable result. Compound may or may not be present.
  - \* Sample analyzed at multiple dilutions. Summary table is a hybrid of diluted and undiluted results.
  - No standard available. Compound was qualitatively searched for.
  - NA Not analyzed
  - NP Not provided
  - IND Indeterminate. Standard and/or spikes could not be detected at method detection limit.
  - BMDL Below Method Detection Limit reported by laboratory.
- Discrepancies may exist between the laboratory data tables and the data validation summary tables due to variations in the rounding of calculations.



**DATA VALIDATION/QUALITY ASSURANCE REVIEW  
PHASE I RCRA FACILITY INVESTIGATION  
CHEM-WASTE MANAGEMENT, INC. - CHICAGO INCINERATOR SITE  
SAMPLE COLLECTION DATES: SEPTEMBER 30 TO OCTOBER 10, 1989  
DAMES & MOORE JOB NO.: 13963-055-192**

**LABORATORY REPORT NO.: 350212, 350216, 350221, 350223 & 350227**

**INTRODUCTION**

A total of thirty (30) soil samples plus two (2) field-duplicate soil samples, one (1) vault sample, two (2) equipment field-blank samples and three (3) trip-blank samples were collected and submitted to Environmental Testing and Certification (ETC) of Edison, New Jersey (1992 Illinois Certification No. 100224). The samples included in the review are listed on Table 1. All soil samples were analyzed for Priority Pollutant (PP) Volatile Organic Compounds (VOA), Semivolatile Organic Compounds (BNA), Organochlorine Pesticides and Polychlorinated Biphenyls (PCBs), metals, total cyanide (CN) and total phenol. The VAULT sample, its associated trip blank and an equipment blank were analyzed for RCRA Appendix IX heated purge and trap (HP/T) VOAs and Appendix IX purge and trap VOAs. A second equipment blank was analyzed for RCRA Appendix IX purge and trap VOAs only. The trip-blank samples were analyzed for PP VOAs only. All samples were analyzed following USEPA SW-846 Methodologies.

Data were examined to assess the usability of the results. The organic data quality review is based upon a rigorous review of the reported hold times, surrogate recovery results, blank spike recoveries, matrix spike and matrix spike duplicate analyses, blank contaminants, internal standard area performance, Gas Chromatography/Mass Spectroscopy (GC/MS) tuning and calibration data.

The inorganic and conventional parameter findings offered in this report are based upon review of the reported hold times, blank analysis results, blank spike recoveries, matrix spike recoveries, duplicate results, instrument calibration verification, post-digestion spike recoveries and Inductively Coupled Plasma (ICP) serial dilution analyses.

The analytical data was presented in an ETC Abbreviated Data Format as requested by Chemical Waste Management, Inc. The laboratory retrieved the archived support documentation for the data validation review; however, not all support documentation was retrievable by the laboratory. Therefore, a quality assurance review rather than data validation is provided for select data points. The quality assurance reviews are not as rigorous as quantitative data validation and for these data, the

quality assurance review assumes the analytical results are correct as reported and merely provides an interpretation of the reported quality control results.

Details of the data validation/quality assurance review are presented in the narrative section of the report. The data is summarized in Table 2 of the report. Data qualifiers have been placed next to the results so that the data user can quickly assess the qualitative and/or quantitative reliability of the reported result. This report was prepared to provide a critical review of the laboratory analysis and reported chemical results. Quality assurance reviews of laboratory-generated data routinely identify problems associated with analytical measurements, even from the most experienced and capable laboratories.

This review has been performed in accordance with the requirements specified in the "Laboratory Data Validation Functional Guidelines for Evaluating Organic Analyses" dated February 1988 and "Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses" dated July 1988.

**TABLE 1**  
**SAMPLES INCLUDED IN REVIEW**

<u>Sample ID</u>	<u>Lab ID</u>	<u>Collection Date</u>	<u>Analyses Requested*</u>
<u>Laboratory Log Link No. 350212</u>			
SG334F1	HA1401	10/01/89	Did not receive data for review
SB339F1	HA1402	09/30/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
SB339F2	HA1403	09/30/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
SB346F1	HA1404	09/30/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
SB346F2	HA1405	09/30/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
SG334F2	HA1406	10/01/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
SG334F2-Dup	HA1407	10/01/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
SB333F1	HA1408	10/01/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
SB333F2	HA1409	10/01/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
SG347F1	HA1410	10/01/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
SG347F2	HA1411	10/01/89	Did not receive data for review
SG349F1	HA1414	10/01/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
SG349F2	HA1415	10/01/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
SB341F1	HA1416	09/30/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
SB341F2	HA1417	09/30/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
SG348F1	HA1420	09/30/89	Did not receive data for review
SG348F2	HA1421	09/30/89	Did not receive data for review
SB340F1	HA1422	09/30/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
SB340F2	HA1423	09/30/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
SB345F1	HA1428	09/30/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
SB345F2	HA1429	09/30/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols

<u>Sample ID</u>	<u>Lab ID</u>	<u>Collection Date</u>	<u>Analyses Requested*</u>
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Laboratory Log Link No. 350216

SB304F1	HA1485	10/05/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
SB304F2	HA1486	10/05/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
SG330F1	HA1487	10/05/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
SG330F2	HA1488	10/05/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols

Laboratory Log Link No. 350221

SG337F1	HA1465	10/06/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
SP319F1	HA1471	10/05/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
SG337F2	HA1475	10/06/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
SG337F2-Dup	HA1476	10/06/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
FILL01EB	HA1519	10/05/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
FILL01TB	HA1698	10/05/89	PP VOA

Laboratory Log Link No. 350222

VAULT	HA1526	10/06/89	HP/T VOA, VOA
VAULT01TB	HA1529	10/06/89	HP/T VOA, VOA

Laboratory Log Link No. 350223

SP319F2	HA1472	10/09/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
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Laboratory Log Link No. 350227

SG318F1	HA1469	10/10/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
SG318F2	HA1470	10/10/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
FILL02EB	HA1518	10/10/89	HP/T VOA, VOA
FILL02TB	HA1699	10/10/89	PP VOA

Legend:

PP VOA	=	Priority Pollutant Volatile Organic Compounds
HP/T VOA	=	RCRA Appendix IX Heated Purge & Trap Volatile Organic Compounds
VOA	=	RCRA Appendix IX Volatile Organic Compounds
PP BNA	=	Priority Pollutant Semi-volatile Organic Compounds (Base/Neutral/Acid Extractable Compounds)
PP Pest/PCB	=	Priority Pollutant Organochlorine Pesticides and Polychlorinated Biphenyls
PP Metals	=	Priority Pollutant Inorganic Parameters
CN	=	Total Cyanide
Phenols	=	Total Phenol

## DATA QUALIFIERS

The data validation review has identified aspects of the analytical data that require qualification. To confidently use any of the data within the data set, the data user should understand the limitations and qualifications presented. With regard to data usability, the following qualifiers are offered based upon the data provided.

### ORGANIC QUALIFIERS

#### Hold Times:

- Samples G334F1, B339F2, G334F2-Dup, G347F1, B340F1, B345F1 (Log Link 350212), XFILL01TB (LL 250221), SB318F1 and SG318F2 (LL 350227) were analyzed for volatile organic compounds 1 to 4 days outside the recommended hold time. There is no impact on data usability and no qualifier has been applied.
- Samples B339F1, B346F1, B333F1, G341F2, B340F2 (Log Link 350212), SB304F1, SB304F2 (LL 350216), SG337F1, SG337F2-Dup (LL 350221) and SP219F2 (LL 350223) were analyzed for volatile organic compounds 5 to 14 days outside the recommended hold time. The positive and non-detected results may be biased low and have been flagged (J/UJ) estimate on Table 2.
- Samples B346F2, G334F2, B333F2, G347F2, G349F2, G348F1, G348F2 and B345F2 (Log Link 350212) were analyzed for volatile organic compounds 15 to 19 days outside the recommended hold time. The positive results may be biased low and have been flagged (J) estimate. The non-detected results are unreliable (compound may or may not be present) and have been flagged (R) on Table 2.
- Sample SP319F2 was analyzed for semi-volatile compounds 5 days outside the 40 day hold time requirement. The positive and non-detected results may be biased low and have been flagged (J/UJ) estimated on Table 2.
- Sample SP319F2 was analyzed for pesticides/PCBs 2 days outside the 40 day hold time requirement. The confirmatory column analyses was performed 11 days outside hold time. It is this reviewer's opinion, however, that there is no impact on data usability and no qualifier has been applied.

#### Blank Contamination:

- Due to the trace presence of the following volatile organic compounds in the associated laboratory and/or field blank samples, positive results of these compounds in the field samples are qualitatively questionable and have been flagged (B) on Table 2. Reported concentrations which are greater than 5 times the blank concentration (10 times for methylene chloride) are regarded as "real" values and no qualifier is applied.

##### Analyte

##### Associated Samples

Methylene chloride

All field samples in LL-350212, 350216, 350221, 350222, 320223 & 350227

Toluene

B304F1, B304F2, G337F1, G337F2-Dup, P319F2, B318F1, B318F2

- Although there is no reason to question the validity of the positive bis(2-ethylhexyl)phthalate, di-n-butylphthalate and/or di-n-octylphthalate results in field samples associated with Log Link 350212 and 350216, it should be noted that phthalate esters are common laboratory and field contaminants and are found in percent concentrations in numerous plastics.
- Due to the trace presence of the following semi-volatile organic compounds (VOAs) in the associated laboratory and/or field blank samples, positive results for these compounds in the field samples are qualitatively questionable and have been flagged (B) on Table 2. Positive concentrations which are greater than five times the blank concentrations (ten times for phthalates) are regarded as "real" values and no qualifier is applied.

##### Analyte

##### Associated Samples

Bis(2-Ethylhexyl)phthalate  
& n-Nitrosodi-n-propylamine

All field Samples in LL 350221, 350223 & 350227

#### Surrogate Recoveries:

- The volatile surrogate compound recoveries for toluene-d8 and bromo-fluorobenzene, associated with sample SB345F2 (LL 350212), fell outside control limits. The positive results and non-detected results are regarded as estimated values and have been flagged (J/UJ) on Table 2.
- The base/neutral semi-volatile surrogate compound, terphenyl-d14, fell outside control limits (high) for samples B331F1, B339F2, B346F1, G334F2-Dup, G349F1, G349F2, B341F1, B341F2, B340F2 (LL 350212),

B304F1, B304F2 and G330F1 (LL 350216). No qualifier is required since only one surrogate per fraction fell outside control limits.

- The base/neutral semi-volatile surrogate compounds, 2-fluorobiphenyl and terphenyl-d14, fell outside control limits (high) for samples B346F2, G334F2, G347F1 and B340F1 (LL 350212). The positive results may be biased high and have been flagged (J) on Table 2. There is no impact on the non-detected values and no qualifier is applied.
- The acid semi-volatile surrogate compound, phenol-d5, fell outside control limits (high) for samples B346F1 (LL 350212), B304F2 and G330F1 (LL 350216). No qualifier is required since only one surrogate per fraction fell outside control limits.
- The pesticide surrogate compounds, tetra-chloromethyl-xylene (TCMX) and dibutylchlorendate (DBC), fell outside control limits (low) for sample B341F1 (LL 350212). Positive results may be biased low and have been flagged (J). The method detection limit may be higher than reported and have been flagged (UJ) on Table 2.
- The pesticide surrogate compounds, tetra-chloromethyl-xylene (TCMX) and dibutylchlorendate (DBC), fell outside control limits (high) for sample B304F1 (LL 350216). Positive results may be biased high. There is no impact on the non-detected results and no qualifier is required.

#### Initial and Continuing Calibration Results:

- In the volatile fraction analysis, the initial and continuing calibration data associated with field samples VAULT, VAULT01TB, B346F1, B333F1, B341F2, B340F2 and B345F2 was not available for review. Therefore, no comments are offered regarding the quantitative validity of the reported results and the internal standard area performance.
- In the heated purge & trap volatile analyses of sample VAULT, VAULT-01TB and XFILL02FB, the initial and continuing calibration data was not available for review. Therefore, no comments are offered regarding the quantitative validity of the reported results. Additionally, the internal standard area performance could not be evaluated.
- The base/neutral/acid extractable and pesticide/PCB support documentation for all samples in Log Link 350212 could not be located in hardcopy or magnetic tape by the laboratory. The results for the aforementioned samples are assumed to be correct as reported by the laboratory and any



data biases (high or low) were noted based upon an evaluation of the limited data provided.

- Due to the high difference between the initial and continuing calibration response factors (%D >35% and <90%), all positive results for the following volatile compounds have been flagged (J) estimated. The actual detection limit may be higher than reported and has been flagged (UJ) estimated in Table 2 of this report.

<u>Analyte</u>	<u>Log Link</u>	<u>Associated Samples</u>
Chloroethane	350212	B339F2
Trichloroethene	350212	B339F1, B346F2, G334F2, B333F2, G347F2, G348F1, G348F2, G349F2
	350216	B304F1, B304F2
	350221	G337F1, G337F2-Dup
	350223	P319F2
Trichloroethene	350227	B318F1, B318F2
Methylene chloride	350212	G349F2, B341F1
	350221	XFILL01TB
	350227	XFILL02TB
Bromomethane & Chloromethane	350212	G349F2
Trichlorofluoromethane	350212	G349F2
	350221	XFILL01TB
	350222	VAULT, VAULT01TB
Dichlorodifluoromethane	350212	G349F2
	350216	G330F1, G330F2
	350221	P319F1, G337F2, XFILL01EB
Vinyl chloride	350212	G349F2, B341F1

- Due to the extremely high percent difference between the initial and continuing calibration response factors (%D >90%), positive result for the following volatile compound have been flagged (J) estimated. The non-detected values are unreliable and have been flagged (R) on Table 2.

<u>Analyte</u>	<u>Log Link</u>	<u>Associated Samples</u>
Chloroethane	350212	B339F1, B346F2, G334F2, B333F2, G347F2, G348F1, G348F2
	350216	B304F1, B304F2
	350221	G337F1, G337F2-Dup

<u>Analyte</u>	<u>Log Link</u>	<u>Associated Samples</u>
Chloroethane	350223	P319F2
	350227	B318F1, B318F2

- Due to the high difference between the initial and continuing calibration response factors (%D > 35% and < 90%), positive results for the following semi-volatile compounds have been flagged (J) estimated on Table 2.

<u>Analyte</u>	<u>Log Link</u>	<u>Associated Sample</u>
Hexachlorocyclopentadiene	350216	All field sample in LL 350216, 350221, 350223 & 350227
Butyl benzyl phthalate, Bis(2-ethylhexyl)phthalate & n-Nitroso-di-propylamine	350216	B304F1, B304F2, G330F1, G330F2
Indeno(1,2,3-c,d) pyrene, Dibenzo(a,h)anthracene & Benzo(g,h,i)perylene	350216	B304F1, B304F2, G330F1, G330F2
Nitrobenzene	350221 350223 350227	G337F1, P319F1, G337F2, G337F2-Dup P319F2 G318F1, G318F2
4-Nitrophenol	350221 350223 350227	G337F1, G337F2, G337F2-Dup P319F2 G318F1, G318F2

- For the pesticide/PCB analyses, the correlation coefficient for the initial calibration fell within acceptable control limits (>0.995) for all samples in LL 250216, 350221, 350223 and 350227.
- For the pesticide/PCB analyses, the analytical sequence requirements were met. However, since the standard chromatograms were not available for review (quantitation reports only), no comments can be offered regarding an evaluation of the system performance with regards to adequate resolution.
- The DDT/Endrin evaluation standard was not provided for the pesticide/PCB analyses of LL 350216. Therefore, the qualitative validity of the positive DDE result in sample G330F1 cannot be assessed.
- The DDT/Endrin percent breakdown associated with LL 350221, 350223 and 350227 was evaluated and fell within acceptable control limits on the primary column. The combined DDT/Endrin percent breakdown was

greater than 30% on the confirmatory column; however, there is no impact on data usability since no samples in this log link were positive for either DDT, Endrin, or their breakdown products.

#### Internal Standard Area Performance:

- The area count of the volatile internal standard, chlorobenzene-d5, associated with samples SB304F1, SG330F1, SB330F2 (LL 350216), and SG337F2-Dup (LL 350221) were reported outside the control limits (low). The positive and non-detected compounds quantitated against this internal standard for these samples may be biased low and have been flagged (J/UJ) estimated on Table 2.
- The area count of the volatile internal standards, difluorobenzene and chlorobenzene-d5, associated with samples SP319F1 (LL 350221), SG318F1 and SG318F2 (LL 350227) were reported outside the control limits (low). The positive and non-detected compounds quantitated against these internal standards for these samples may be biased low and have been flagged (J/UJ) estimated on Table 2.
- The area count of the semi-volatile internal standards, chrysene-d12 and perylene-d12, associated with samples G337F2, G337F2-Dup (LL 350221) and G318F2 (LL 350227), were reported outside the control limits (low). The positive and non-detected compounds quantitated against these internal standards for this samples may be biased low and have been flagged (J/UJ) estimated on Table 2.

#### Matrix Spikes (MS) and Matrix Spike Duplicate (MSD) Results:

- Field duplicate samples G334F2 and G334F2-Dup (LL 350212) were collected and submitted to the laboratory. Overall, the reproducibility of the organic analyses are good, providing a positive indication of the field techniques and laboratory precision associated with these samples.
- Field duplicate samples SG327F2 and SG327F2-Dup (LL 350221) were collected and submitted to the laboratory. Several compounds were detected at trace concentrations in SG327F2-Dup which were not detected in SG327F2. The poor reproducibility may be due to a lack of sample homogeneity. The positive and non-detected results are regarded as estimated values and have been flagged (J/UJ) on Table 2.
- In the semi-volatile analysis of LL 250216, the blank spike, MS and MSD recoveries were high for bis(2-ethylhexyl)phthalate and butyl benzyl phthalate. The positive results for these compounds may be biased high

and have been flagged (J) on Table 2. There is no impact on the non-detected values and no qualifier is applied.

**Additional Comments:**

- As per the requirements, all values calculated below the method detection limit should be considered estimated and have been flagged (J) in Table 2 of this report.

**INORGANIC and CONVENTIONAL PARAMETER QUALIFIERS**

**General Comments:**

- With the exception of the sample preparation log, no support documentation was received for review for the metal and conventional parameters associated with ETC Log Link 350212. Therefore, no comments are offered regarding the qualitative or quantitative validity of the reported results in the aforementioned data set.
- In the metals fraction, this reviewer has observed that for the ICP concentrations reported at 10 to 15 times above the method detection limit (MDL), the data validation cannot reproduce the laboratory reported results. The calculation obtained during data validation is consistently higher than the laboratory reported concentration. This is due to the fact that the interelement correction factors in the ICP instrument have been externally calculated. Since this external interelement correction factor is not available for review, the reported results for low level samples cannot be reproduced. It should be noted that positive ICP reported results that are significantly above than the MDL were reproduced and validated, since this interelement correction factor becomes negligible at higher concentrations. The data review assumes that the low level reported concentrations are correct as reported and it is this reviewer's opinion that data usability is not impacted.

**Hold Times:**

- All samples were digested and analyzed within the required hold time criteria for metals and cyanide. The preparation and analysis date of the total phenols was not available for review; however, based upon the date of report, it appears that the hold time criteria was met for the total phenols analyses as well.

#### Blank Contamination:

- No blank contaminants have been identified that require qualification on the metals or cyanide for the samples included in log links (LL) 350200, 350202 and 350203.

#### Inductively Coupled Plasma (ICP) Serial Dilution Results:

- The ICP serial dilution analyses of zinc was greater than 10% for sample BS-5 (QC Batch 30087). However, this does not impact the field samples in Log Links 350216, 250221, 350223 and 350227 and no qualifier is required.

#### Matrix Spike (MS) and Duplicate (DU) Summary Results:

- The matrix spike recovery of zinc in the spiked sample BS-5 was outside (low) control limits. No qualifier has been applied since the concentration of this analyte in the unspiked sample was greater than 4 times the spike concentration.
- Zinc exhibited a high percent difference in the duplicate analysis of SB-5. There is no impact, however, on the samples associated with LL 350216, 350221, 350223 and 350227 and no qualifier has been applied.
- Field duplicate samples B334F2 and G334F2-Dup (LL 350212) were collected and submitted to the laboratory. The positive results in sample B334F2 were consistently higher than B334F2-Dup. The lack of reproducibility may be due to a lack of sample homogeneity. The positive results in the duplicate pair are regarded as estimated values and have been flagged (J) on Table 2.
- Field duplicate samples G337F2 and G337F2-Dup (LL 350221) were collected and submitted to the laboratory. Overall, the reproducibility of the metal and cyanide results are good, providing a positive indication of the field techniques and laboratory precision associated with these samples.

#### Post-Digestion Spike Recoveries:

- The post-digestion spike recoveries of the following analytes were outside the control limits (low). Positive and/or non-detected results of these analytes for the associated samples may be biased low and have been flagged (J/UJ) estimated.

<u>Analyte</u>	<u>Log Link</u>	<u>Associated Samples</u>
Arsenic	3502221	P319F1
Selenium	350216	G330F1, G330F2
	350221	G337F1, G337F2, G337F2-Dup, P319F1
	350223	P319F2
	350227	G318F1, G318F2

**Additional Comments:**

- The laboratory reports several inorganic results as below the method detection limit (BMDL). These are reported as BMDL on Table 2. The actual concentrations are not calculated during the data validation review since the interelement coefficient factors were not provided.

TABLE 2  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number Laboratory Sample Number Sampling Date Dilution Factor Units	Quant Limit ug/L	Quant Limit ug/Kg	SB333F1 HA1408 10/01/89 10.0 ug/Kg	SB333F2 HA1409 10/01/89 1.0 ug/Kg	SB334F2 HA1408 10/01/89 1.0 ug/Kg	B334F2-Dup HA1407 10/01/89 1.0 ug/Kg	SB339F1 HA1402 9/30/89 1.0 ug/Kg	SB339F2 HA1403 9/30/89 1.0 ug/Kg	SB340F1 HA1422 9/30/89 1.0 ug/Kg	SB340F2 HA1423 9/30/89 50.0 ug/Kg	SB341F1 HA1416 9/30/89 10/100 ug/Kg
PRIORITY POLLUTANT P/T VOLATILE COMPOUNDS											
Benzene	4.4	4.4	573 J	25.9 J	R	U	0.64 J	1.3 J	3.7 J	1.2 J	12700
Bromofom	4.7	4.7	UJ	R	R	U	U	U	U	UJ	U
Carbon Tetrachloride	2.8	2.8	UJ	R	R	U	U	U	U	UJ	U
Chlorobenzene	6.0	6.0	UJ	R	R	U	U	U	U	UJ	4.4 J
Chlorodibromomethane	3.1	3.1	UJ	R	R	U	U	U	U	UJ	U
Chloroethane	10	10	UJ	R	R	U	UJ	U	U	UJ	U
2-Chloroethylvinyl ether	10	10	UJ	R	R	U	U	U	U	UJ	U
Chloroform	1.6	1.6	UJ	R	R	U	U	U	U	UJ	U
Dichlorobromomethane	2.2	2.2	UJ	R	R	U	U	U	U	UJ	U
Dichlorodifluoromethane	10	10	UJ	R	R	U	U	U	U	UJ	U
1,1-Dichloroethane	4.7	4.7	UJ	R	R	U	U	U	U	UJ	U
1,2-Dichloroethane	2.8	2.8	UJ	R	R	U	U	U	U	UJ	U
1,1-Dichloroethene	2.8	2.8	31.9 J	13.6 J	R	U	U	2.1 J	2.5 J	227	U
1,2-Dichloropropane	6.0	6.0	UJ	R	R	U	U	U	U	UJ	U
cis-1,3-Dichloropropene	5.0	5.0	UJ	R	R	U	U	U	U	UJ	U
Ethylbenzene	7.2	7.2	88.8 J	2.4 J	R	U	U	U	U	UJ	U
Methyl bromide	10	10	UJ	R	R	U	U	U	U	472	U
Methyl chloride	10	10	UJ	R	R	U	U	U	U	UJ	U
Methylene Chloride	2.8	2.8	141 J	59.1 J	22.4 J	29.1 B	47.9 JB	81.1 B	30.9 B	UJ	81.6 JB
1,1,2,2-Tetrachloroethane	4.1	4.1	UJ	R	R	U	U	U	U	UJ	U
Tetrachloroethene	4.1	4.1	UJ	2.1 J	R	U	UJ	U	U	UJ	U
Toluene	6.0	6.0	657 J	23.4 J	1.8 J	U	2.8 J	1.9 J	1.8 J	3.7 J	0.71 J
1,2-Dichloroethene (trans)	1.6	1.6	UJ	R	R	U	U	U	U	UJ	U
1,1,1-Trichloroethane	3.8	3.8	UJ	R	R	U	UJ	U	U	UJ	U
1,1,2-Trichloroethane	5.0	5.0	UJ	R	1.7 J	U	1.8 J	3.0 J	U	UJ	U
Trichloroethene	1.9	1.9	UJ	4.21 J	R	U	U	3.05	U	UJ	U
Trichlorofluoromethane	10	10	UJ	2.1 J	2.4 J	6.3 J	2.6 J	3.0 J	1.2 J	UJ	U
Vinyl Chloride	10	10	UJ	R	R	U	UJ	U	U	UJ	U
trans-1,3-Dichloropropene	10	10	UJ	R	R	U	UJ	U	U	UJ	U

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number			SB333F1	SB333F2	SB334F2	B334F2-Dup	SB339F1	SB339F2	SB340F1	SB340F2	SB341F1
Laboratory Sample Number			HA1408	HA1409	HA1408	HA1407	HA1402	HA1403	HA1422	HA1423	HA1416
Sampling Date	Quant	Quant	10/01/89	10/01/89	10/01/89	10/01/89	9/30/89	9/30/89	9/30/89	9/30/89	9/30/89
Dilution Factor	Limit	Limit	10.0	1.5	1.0	1.2	1.2	1.4	10.0	12.0	11.0
Units	ug/L	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
PRIORITY POLLUTANT ACID EXTRACTABLE COMPOUNDS											
2-Chlorophenol	3.9	340	U	U	U	U	U	U	U	U	U
2,4-Dichlorophenol	3.2	280	U	U	U	U	U	U	U	U	U
2,4-Dimethylphenol	3.2	280	U	U	U	U	U	U	U	U	U
4,6-Dinitro-2-methylphenol	29	2400	U	U	U	U	U	U	U	U	U
2,4-Dinitrophenol	50	4300	U	U	U	U	U	U	U	U	U
2-Nitrophenol	4.3	370	U	U	U	U	U	U	U	U	U
4-Nitrophenol	2.9	240	U	U	U	U	U	U	U	U	U
4-Chloro-3-methylphenol	3.6	310	U	U	U	U	U	U	U	U	U
Pentachlorophenol	4.3	370	U	U	U	U	U	U	U	U	U
Phenol	1.8	150	6090	2080	U	312	U	U	32600	7080	U
2,4,6-Trichlorophenol	3.2	280	U	U	U	U	U	U	U	U	U

continued next page (see last page of table for notes)



TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number Laboratory Sample Number Sampling Date Dilution Factor Units	Quant Limit ug/L	Quant Limit ug/Kg	SB333F1 HA1408 10/01/89 10.0 ug/Kg	SB333F2 HA1409 10/01/89 1.5 ug/Kg	SB334F2 HA1406 10/01/89 1.0 ug/Kg	B334F2-Dup HA1407 10/01/89 1.2 ug/Kg	SB339F1 HA1402 9/30/89 1.2 ug/Kg	SB339F2 HA1403 9/30/89 1.4 ug/Kg	SB340F1 HA1422 9/30/89 10.0 ug/Kg	SB340F2 HA1423 9/30/89 12.0 ug/Kg	SB341F1 HA1416 9/30/89 11.0 ug/Kg
PRIORITY POLLUTANT BASE/NEUTRAL EXTRACTABLE COMPOUNDS											
Acenaphthene	2.3	220	3970	867	U	U	190 J	U	U	U	3220
Acenaphthylene	4.2	410	4790	1410	U	U	U	U	U	U	U
Anthracene	2.3	220	7330	2130	U	U	576	U	U	U	5810
Benzo(a)anthracene	9.3	910	U	4710	U	U	3140	880 J	U	1120 J	15000
Benzo(a)pyrene	3.0	290	U	2760	U	U	2040	493	U	1910 J	13000
Benzo(b)fluoranthene	5.7	560	U	3200	U	U	U	573 J	U	2600 J	19200
Benzo(g,h,i)perylene	4.9	480	U	653	U	U	U	U	U	U	U
Benzo(k)fluoranthene	3.0	290	U	U	U	U	4670	733	U	U	2720 J
bis(2-Chloroethoxy)methane	6.3	620	U	U	U	U	U	U	U	U	U
Bis(2-chloroethyl) ether	6.8	660	U	U	U	U	U	U	U	U	U
bis(2-chloroisopropyl) ether	6.8	660	U	U	U	U	U	U	U	U	U
bis(2-Ethylhexyl)phthalate	12	1200	U	360 J	2130	U	U	U	U	U	U
4-Bromophenylphenyl ether	2.3	220	U	U	U	U	U	U	U	U	U
Butylbenzylphthalate	12	1200	U	U	U	U	U	U	U	U	U
2-Chloronaphthalene	2.3	220	U	U	U	U	U	U	U	U	U
4-Chlorophenylphenyl ether	5.0	490	U	U	U	U	U	U	U	U	U
Chrysene	3.0	290	U	2440	U	U	1670	403	U	U	16400
Dibenz(a,h)anthracene	3.0	290	U	340 J	U	U	U	U	U	U	U
1,2-Dichlorobenzene	2.3	220	U	U	U	U	U	U	U	U	U
1,3-Dichlorobenzene	2.3	220	U	U	U	U	U	U	U	U	U
1,4-Dichlorobenzene	5.2	510	U	U	U	U	U	U	U	U	U
3,3'-Dichlorobenzidine	19.6	1920	U	U	U	U	U	U	U	U	U
Diethylphthalate	12	1200	U	U	U	U	U	U	U	U	U
Dimethylphthalate	12	1200	U	U	U	U	U	U	U	U	U
Di-n-butylphthalate	12	1200	U	U	265	535 J	U	363 J	U	U	U
2,4-Dinitrotoluene	6.8	660	U	U	U	U	U	U	U	U	U
2,6-Dinitrotoluene	2.3	220	U	U	U	U	U	U	U	U	U
Di-n-octylphthalate	12	1200	U	U	U	U	U	U	U	U	U
Fluoranthene	2.6	260	9430	3970	U	U	4130	857	U	5060	31200
Fluorene	2.3	220	921	2180	U	U	U	U	U	U	3710
Hexachlorobenzene	2.3	220	U	U	U	U	U	U	U	U	U
Hexachlorobutadiene	1.1	100	U	U	U	U	U	U	U	U	U
Hexachlorocyclopentadiene	12	1200	U	U	U	U	U	U	U	U	U
Hexachloroethane	1.9	190	U	U	U	U	U	U	U	U	U
Indeno(1,2,3-cd)pyrene	4.4	430	U	360 J	U	U	U	U	U	U	3072 J
Isophorone	2.6	260	U	U	U	U	U	U	U	U	U
Naphthalene	1.9	190	20300	6740	U	U	423	185 J	2870 J	U	2820
Nitrobenzene	2.3	220	U	U	U	U	U	U	U	U	U
N-Nitroso-dimethylamine	12	1200	U	U	U	U	U	U	U	U	U
N-Nitroso-di-n-propylamine	12	1200	U	U	U	U	U	U	U	U	U
N-Nitroso-diphenylamine	2.3	220	U	U	U	U	U	U	U	U	U
Phenanthrene	6.4	630	27100	7720	U	U	2430	660 J	1780 J	4165 J	22400
Pyrene	2.3	220	12900	4650	U	U	3090	671	U	5100	28400
1,2,4-Trichlorobenzene	2.3	220	U	U	U	U	U	U	U	U	U

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number			SB333F1	SB333F2	SB334F2	B334F2-Dup	SB339F1	SB339F2	SB340F1	SB340F2	SB341F1
Laboratory Sample Number			HA1408	HA1409	HA1406	HA1407	HA1402	HA1403	HA1422	HA1423	HA1416
Sampling Date	Quant	Quant	10/01/89	10/01/89	10/01/89	10/01/89	9/30/89	9/30/89	9/30/89	9/30/89	9/30/89
Dilution Factor	Limit	Limit	3.5	4.3	1.0	3.5	3.5	4.0	3.3	3.3	3.4
Units	ug/L	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
PESTICIDES											
Aldrin	0.05	1.7	U	U	U	U	U	U	U	U	U
Alpha-BHC	0.05	1.7	U	U	U	U	U	U	U	U	U
Beta-BHC	0.05	1.7	U	U	U	U	U	U	U	U	U
Gamma-BHC (Lindane)	0.05	1.7	U	U	U	U	U	U	U	U	U
Delta-BHC	0.05	1.7	U	U	U	U	U	U	U	U	U
Chlordane	1.0	33	U	U	U	U	U	U	U	U	U
4,4'-DDT	0.10	3.3	U	U	U	U	U	U	U	U	U
4,4'-DDE	0.10	3.3	U	U	U	U	U	U	U	U	U
4,4'-DDD	2.5	83	U	U	U	U	U	U	U	U	22.3 J
Dieldrin	0.10	3.3	U	U	U	U	U	U	U	U	U
Endosulfan I	0.05	1.7	U	U	U	U	U	U	U	U	U
Endosulfan II	0.10	3.3	U	U	U	U	U	U	U	U	U
Endosulfan Sulfate	0.10	3.3	U	U	U	U	U	U	U	U	U
Endrin	0.10	3.3	U	U	U	U	U	U	U	U	U
Endrin Aldehyde	0.10	3.3	U	U	U	U	U	U	U	U	U
Heptachlor	0.05	1.7	U	U	U	U	U	U	U	U	U
Heptachlor Epoxide	0.05	1.7	U	U	U	U	U	U	U	U	U
Toxaphene	2.0	65	U	U	U	U	U	U	U	U	U
Arochlor-1016	0.55	18	U	U	U	U	U	U	U	U	U
Arochlor-1221	0.55	18	U	U	U	U	U	U	U	U	U
Arochlor-1232	0.55	18	U	U	U	U	U	U	U	U	U
Arochlor-1242	0.55	18	U	U	U	U	U	U	U	U	U
Arochlor-1248	0.55	18	U	U	U	U	U	U	U	U	U
Arochlor-1254	1.0	33	U	U	U	U	U	U	U	U	U
Arochlor-1260	1.0	33	U	U	U	U	U	U	U	U	U

continued next page (see last page of table for notes)

**TABLE 2 (continued)**  
**SUMMARY OF ANALYTICAL RESULTS**  
**PHASE I INVESTIGATION**  
**CHEMICAL WASTE MANAGEMENT**  
**CHICAGO, ILLINOIS**

Dames and Moore Sample Number Laboratory Sample Number Sampling Date Units	Quant Limit ug/L	Quant Limit ug/Kg	SB333F1 HA1405 10/01/89 ug/Kg	SB333F2 HA1409 10/01/89 ug/Kg	SB334F2 HA1406 10/01/89 ug/Kg	B334F2-Dup HA1407 10/01/89 ug/Kg	SB339F1 HA1402 9/30/89 ug/Kg	SB339F2 HA1403 9/30/89 ug/Kg	SB340F1 HA1422 9/30/89 ug/Kg	SB340F2 HA1423 9/30/89 ug/Kg	SB341F1 HA1418 9/30/89 ug/Kg
<b>PRIORITY POLLUTANT INORGANIC PARAMETERS (METALS)</b>											
Antimony	60	6000	18000	BMDL J	11000 J	UJ	20000	19000	12000	BMDL J	21000
Arsenic	10	1000	9900	8000	6200 J	5200 J	U	13000	31000	25000	27000
Beryllium	1.0	100	810	520	360 J	BMDL J	2300	2300	2000	1400	2000
Cadmium	2.0	200	590	BMDL J	U	U	1700	1000	4300	3800	4200
Chromium	10	1000	61000	16000	14000 J	3900 J	41000	37000	51000	45000	58000
Copper	10	1000	51000	13000	16000 J	3700 J	26000	29000	34000	32000	133000
Lead	5.0	500	130000	77000	11000 J	BMDL J	55000	62000	41000	49000	470000
Mercury	0.20	80	280	BMDL J	BMDL J	UJ	140	BMDL J	140	130	490
Nickel	20	1000	33000	13000	21000 J	4900 J	22000	30000	30000	18000	25000
Selenium	5.0	500	BMDL J	BMDL J	UJ	UJ	2500 J	1900	BMDL J	3300	2100
Silver	10	1000	U	U	U	U	U	U	1900	3100	U
Thallium	10	1000	BMDL J	BMDL J	U	UJ	BMDL J	BMDL J	BMDL J	BMDL J	1500
Zinc	20	2000	244000	99000	47000 J	24000 J	230000	190000	210000	190000	493000
Cyanide, total	mg/L 0.010	mg/Kg 0.5	mg/Kg U	mg/Kg U	mg/Kg U	mg/Kg U	mg/Kg 0.632	mg/Kg U	mg/Kg U	mg/Kg U	mg/Kg U
Phenols, total	0.10	3.0	U	U	U	U	U	U	6.0	6.2	U

**LEGEND:**

- U Compound was not detected at laboratory method detection limit.
  - J Estimated value due to limitations identified during the quality assurance review.
  - UJ reported method detection limit is estimated due to limitations identified during the quality assurance review.
  - B Compound was detected in a laboratory and/or field blank at similar concentrations. May represent laboratory and/or field contamination.
  - R Unreliable result. Compound may or may not be present.
  - \* Sample analyzed at multiple dilutions. Summary table is a hybrid of diluted and undiluted results.
  - No standard available. Compound was qualitatively searched for.
  - IND Indeterminate. Standard and/or spikes could not be detected at method detection limit.
  - BMDL Below Method Detection Limit reported by laboratory.
- Discrepancies may exist between the laboratory data tables and the data validation summary tables due to variations in the rounding of calculations.

TABLE 2  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number			SB341F2	SB345F1	SB345F2	SB346F1	SB346F2	SB347F1	SB349F1	SB349F2
Laboratory Sample Number			HA 1417	HA 1428	HA 1429	HA 1404	HA 1405	HA 1410	HA 1414	HA 1415
Sampling Date	Quant	Quant	9/30/89	9/30/89	9/30/89	9/30/89	9/30/89	10/01/89	10/01/89	10/01/89
Dilution Factor	Limit	Limit	20.0	2.0	1.0	20.0	1.0	1.0	10.0	20.0
Units	ug/L	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
PRIORITY POLLUTANT P/T VOLATILE COMPOUNDS										
Benzene	4.4	4.4	250 J	31.4	1.5 J	UJ	R	U	U	154
Bromoform	4.7	4.7	UJ	U	R	UJ	R	U	U	UJ
Carbon Tetrachloride	2.8	2.8	UJ	U	R	UJ	R	U	U	UJ
Chlorobenzene	6.0	6.0	UJ	63.0	R	322 J	R	U	U	3.4 J
Chlorodibromomethane	3.1	3.1	UJ	U	R	UJ	R	U	U	UJ
Chloroethane	10	10	UJ	U	R	UJ	R	U	U	UJ
2-Chloroethylvinyl ether	10	10	UJ	U	R	UJ	R	U	U	UJ
Chloroform	1.6	1.6	UJ	U	R	UJ	R	U	U	UJ
Dichlorobromomethane	2.2	2.2	UJ	U	R	UJ	R	U	U	UJ
Dichlorodifluoromethane	10	10	UJ	U	R	UJ	R	U	U	UJ
1,1-Dichloroethane	4.7	4.7	UJ	U	R	UJ	R	U	U	UJ
1,2-Dichloroethane	2.8	2.8	UJ	U	R	UJ	R	U	U	UJ
1,1-Dichloroethene	2.8	2.8	UJ	12.7	R	UJ	R	U	U	UJ
1,2-Dichloropropane	6.0	6.0	UJ	U	R	UJ	R	U	U	UJ
cis-1,3-Dichloropropene	5.0	5.0	UJ	U	R	UJ	R	U	U	UJ
Ethylbenzene	7.2	7.2	UJ	6.3 J	1.4 J	863 J	R	U	2.0 J	1790
Methyl bromide	10	10	UJ	U	R	UJ	R	U	U	UJ
Methyl chloride	10	10	UJ	U	R	UJ	R	U	U	UJ
Methylene Chloride	2.8	2.8	118 JB	59.7 B	18.6 J	98.8 JB	8.99 JB	25.0 B	173 B	405 JB
1,1,2,2-Tetrachloroethane	4.1	4.1	UJ	U	R	UJ	R	U	U	UJ
Tetrachloroethene	4.1	4.1	UJ	U	R	UJ	R	U	976	424 J
Toluene	6.0	6.0	4.7 J	191	13.2 J	622 J	1.4 J	U	3.5 J	2720 J
1,2-Dichloroethene (trans)	1.6	1.6	UJ	U	R	UJ	R	U	U	UJ
1,1,1-Trichloroethane	3.8	3.8	UJ	U	R	UJ	R	U	U	UJ
1,1,2-Trichloroethane	5.0	5.0	UJ	U	R	UJ	R	U	U	UJ
Trichloroethene	1.9	1.9	UJ	U	R	UJ	R	U	U	45.0 J
Trichlorofluoromethane	10	10	UJ	U	1.8 J	UJ	R	2.9 J	1.4 J	UJ
Vinyl Chloride	10	10	UJ	U	R	UJ	R	U	U	UJ
trans-1,3-Dichloropropene	10	10	UJ	U	R	UJ	R	U	U	UJ

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number			SB341F2	SB345F1	SB345F2	SB346F1	SB346F2	SB347F1	SB349F1	SB349F2
Laboratory Sample Number			HA1417	HA1428	HA1429	HA1404	HA1405	HA1410	HA1414	HA1415
Sampling Date	Quant	Quant	9/30/89	9/30/89	9/30/89	9/30/89	9/30/89	10/01/89	10/01/89	10/01/89
Dilution Factor	Limit	Limit	1.3	1.3	2.0	13.0	1.0	1.2	1.7	1.2
Units	ug/L	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
PRIORITY POLLUTANT ACID EXTRACTABLE COMPOUNDS										
2-Chlorophenol	3.9	340	U	21500	6170	6740	U	U	U	U
2,4-Dichlorophenol	3.2	280	185 J	26600	1130	U	U	U	U	U
2,4-Dimethylphenol	3.2	280	U	U	U	U	U	U	U	U
4,6-Dinitro-2-methylphenol	29	2400	U	U	U	U	U	U	U	U
2,4-Dinitrophenol	50	4300	U	U	U	U	U	U	U	U
2-Nitrophenol	4.3	370	U	U	U	U	U	U	U	U
4-Nitrophenol	2.9	240	U	U	U	U	U	U	U	U
4-Chloro-3-methylphenol	3.6	310	U	U	U	U	U	U	U	U
Pentachlorophenol	4.3	370	U	U	U	U	U	U	U	U
Phenol	1.8	150	U	4390	U	2050	1680	U	1450	U
2,4,6-Trichlorophenol	3.2	280	U	U	U	U	U	U	U	U

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number			SB341F2	SB345F1	SB345F2	SB346F1	SB346F2	SB347F1	SB349F1	SB349F2
Laboratory Sample Number			HA1417	HA1428	HA1429	HA1404	HA1405	HA1410	HA1414	HA1415
Sampling Date	Quant	Quant	9/30/89	9/30/89	9/30/89	9/30/89	9/30/89	10/01/89	10/01/89	10/01/89
Dilution Factor	Limit	Limit	1.2	1.2	1.3	12.0	1.0	1.1	1.0	1.1
Units	ug/L	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
PRIORITY POLLUTANT BASE/NEUTRAL EXTRACTABLE COMPOUNDS										
Acenaphthene	2.3	220	437	U	U	U	U	U	U	U
Acenaphthylene	4.2	410	U	U	U	U	U	U	U	U
Anthracene	2.3	220	488	U	U	U	U	U	U	U
Benzo(a)anthracene	9.3	910	1170	U	U	U	U	U	U	U
Benzo(a)pyrene	3.0	290	851	U	U	U	U	U	U	U
Benzo(b)fluoranthene	5.7	560	1120	U	U	U	U	U	U	U
Benzo(g,h,i)perylene	4.9	480	U	U	U	U	U	U	U	U
Benzo(k)fluoranthene	3.0	290	U	U	U	U	U	U	U	U
bis(2-Chloroethoxy)methane	6.3	620	U	U	U	U	U	U	U	U
Bis(2-chloroethyl) ether	6.8	660	U	U	U	U	U	U	U	U
bis(2-chloroisopropyl) ether	6.8	660	U	U	U	U	U	U	U	U
bis(2-Ethylhexyl)phthalate	12	1200	260 J	9370	165 J	U	U	U	U	U
4-Bromophenylphenyl ether	2.3	220	U	U	U	U	U	U	U	U
Butylbenzylphthalate	12	1200	U	U	U	U	U	U	U	U
2-Chloronaphthalene	2.3	220	U	U	U	U	U	U	U	U
4-Chlorophenylphenyl ether	5.0	490	U	U	U	U	U	U	U	U
Chrysene	3.0	290	870	U	U	U	U	U	U	U
Dibenz(a,h)anthracene	3.0	290	U	U	U	U	U	U	U	U
1,2-Dichlorobenzene	2.3	220	U	U	U	U	U	U	U	U
1,3-Dichlorobenzene	2.3	220	U	U	U	U	U	U	U	U
1,4-Dichlorobenzene	5.2	510	U	U	U	U	U	U	U	U
3,3'-Dichlorobenzidine	19.6	1920	U	U	U	U	U	U	U	U
Diethylphthalate	12	1200	U	U	U	U	U	U	U	U
Dimethylphthalate	12	1200	U	U	U	U	U	U	U	U
Di-n-butylphthalate	12	1200	240 J	U	U	U	304 J	U	U	U
2,4-Dinitrotoluene	6.8	660	U	U	U	U	U	U	U	U
2,6-Dinitrotoluene	2.3	220	U	U	U	U	U	U	U	U
Di-n-octylphthalate	12	1200	U	U	U	U	U	U	U	U
Fluoranthene	2.6	260	1850	U	U	179 J	477 J	U	576	U
Fluorene	2.3	220	373	U	U	125 J	U	U	U	U
Hexachlorobenzene	2.3	220	U	U	U	U	U	U	2020	U
Hexachlorobutadiene	1.1	100	U	U	U	U	U	U	U	U
Hexachlorocyclopentadiene	12	1200	U	U	U	U	U	U	U	U
Hexachloroethane	1.9	190	U	U	U	U	U	U	U	U
Indeno(1,2,3-cd)pyrene	4.4	430	U	U	U	U	U	U	U	U
Isophorone	2.6	260	U	U	U	U	U	U	U	U
Naphthalene	1.9	190	599	U	U	U	U	U	534	3140
Nitrobenzene	2.3	220	U	777	U	U	U	U	U	U
N-Nitroso-dimethylamine	12	1200	U	U	U	U	U	U	U	U
N-Nitroso-di-n-propylamine	12	1200	U	U	U	U	U	U	U	U
N-Nitroso-diphenylamine	2.3	220	U	U	U	U	U	U	U	U
Phenanthrene	6.4	630	1920	U	U	583 J	437 J	U	291 J	U
Pyrene	2.3	220	1560	U	U	170 J	410 J	U	U	U
1,2,4-Trichlorobenzene	2.3	220	U	U	U	U	U	U	U	U

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number			SB341F2	SB345F1	SB345F2	SB346F1	SB346F2	SB347F1	SB349F1	SB349F2
Laboratory Sample Number			HA 1417	HA 1428	HA 1429	HA 1404	HA 1405	HA 1410	HA 1414	HA 1415
Sampling Date			9/30/89	9/30/89	9/30/89	9/30/89	9/30/89	10/01/89	10/01/89	10/01/89
Dilution Factor	Quant Limit	Quant Limit	3.7	3.7	4.1	3.6	3.3	3.4	4.8	3.4
Units	ug/L	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
PESTICIDES										
Aldrin	0.05	1.7	U	U	U	U	U	U	U	U
Alpha-BHC	0.05	1.7	U	U	U	U	U	U	U	U
Beta-BHC	0.05	1.7	U	U	U	U	U	U	U	U
Gamma-BHC (Lindane)	0.05	1.7	U	U	U	U	U	U	U	U
Delta-BHC	0.05	1.7	U	U	U	U	U	U	U	U
Chlordane	1.0	33	U	U	U	U	U	U	U	U
4,4'-DDT	0.10	3.3	U	U	U	U	U	U	U	U
4,4'-DDE	0.10	3.3	U	U	U	U	U	U	U	U
4,4'-DDD	2.5	83	U	U	U	U	U	U	U	U
Dieldrin	0.10	3.3	U	U	U	U	U	U	U	U
Endosulfan I	0.05	1.7	U	U	U	U	U	U	U	U
Endosulfan II	0.10	3.3	U	U	U	U	U	U	U	U
Endosulfan Sulfate	0.10	3.3	U	U	U	U	U	U	U	U
Endrin	0.10	3.3	U	U	U	128	U	U	U	U
Endrin Aldehyde	0.10	3.3	U	U	U	U	U	U	U	U
Heptachlor	0.05	1.7	U	U	U	U	U	U	U	U
Heptachlor Epoxide	0.05	1.7	U	U	U	U	U	U	U	U
Toxaphene	2.0	65	U	U	U	U	U	U	U	U
Arochlor-1016	0.55	18	U	U	U	U	U	U	U	U
Arochlor-1221	0.55	18	U	U	U	U	U	U	U	U
Arochlor-1232	0.55	18	U	U	U	U	U	U	U	U
Arochlor-1242	0.55	18	U	U	U	U	U	U	U	U
Arochlor-1248	0.55	18	U	U	U	U	U	U	U	U
Arochlor-1254	1.0	33	U	U	U	U	U	U	U	U
Arochlor-1260	1.0	33	U	U	U	U	U	U	U	U

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number Laboratory Sample Number Sampling Date Units	Quant Limit ug/L	Quant Limit ug/Kg	SB341F2 HA1417 9/30/89 ug/Kg	SB345F1 HA1428 9/30/89 ug/Kg	SB345F2 HA1429 9/30/89 ug/L	SB346F1 HA1404 9/30/89 ug/L	SB346F2 HA1405 9/30/89 ug/L	SB347F1 HA1410 10/01/89 ug/Kg	SB349F1 HA1414 10/01/89 ug/Kg	SB349F2 HA1415 10/01/89 ug/Kg
PRIORITY POLLUTANT INORGANIC PARAMETERS (METALS)										
Antimony	60	6000	22000	11000	30000 J	29000	20000	9200	BMDL J	14000
Arsenic	10	1000	26000	19000	31000	27000	15000	7500	BMDL J	30000
Beryllium	1.0	100	2000	3000	2600 J	2300	1600	260	1600	2000
Cadmium	2.0	200	4000	6600	3600	1600	2500	U	870	2200
Chromium	10	1000	52000	76000	79000	68000	43000	10000	60000	47000
Copper	10	1000	26000	47000	31000 J	33000	20000	25000	22000	22000
Lead	5.0	500	360000	57000	46000 J	51000	37000	24000	75000	32000
Mercury	0.20	80	140	BMDL J	U	120	180	BMDL J	160	BMDL J
Nickel	20	1000	34000	40000	44000 J	38000	24000	23000	28000	27000
Selenium	5.0	500	BMDL J	1700	4200	2700	2200	BMDL J	BMDL J	2700
Silver	10	1000	U	3700	BMDL J	U	U	U	BMDL J	BMDL J
Thallium	10	1000	2500	1700	3800	2300 J	1500 J	BMDL J	BMDL J	3100
Zinc	20	2000	656000	425000	476000	308000	252000	52000	210000	250000
	mg/L	mg/Kg	mg/Kg	mg/Kg	mg/L	mg/L	mg/L	mg/Kg	mg/Kg	mg/Kg
Cyanide, total	0.010	0.5	U	U	U	U	U	U	U	U
Phenols, total	0.10	3.0	U	33	4.7	5.0	U	U	U	U

LEGEND:

- U Compound was not detected at laboratory method detection limit.
  - J Estimated value due to limitations identified during the quality assurance review.
  - UJ Reported method detection limit is estimated due to limitations identified during the quality assurance review.
  - B Compound was detected in a laboratory and/or field blank at similar concentrations. May represent laboratory and/or field contamination.
  - R Unreliable result. Compound may or may not be present.
  - \* Sample analyzed at multiple dilutions. Summary table is a hybrid of diluted and undiluted results.
  - No standard available. Compound was qualitatively searched for.
  - IND Indeterminate. Standard and/or spikes could not be detected at method detection limit.
  - BMDL Below Method Detection Limit reported by laboratory.
- Discrepancies may exist between the laboratory data tables and the data validation summary tables due to variations in the rounding of calculations.



**TABLE 2**  
**SUMMARY OF ANALYTICAL RESULTS**  
**PHASE I INVESTIGATION**  
**CHEMICAL WASTE MANAGEMENT**  
**CHICAGO, ILLINOIS**

Dames and Moore Sample Number			B304F1	B304F2	G318F1	G318F2	P319F1	P319F2	G330F1	G330F2	G337F1	G337F2	G337F2DUP	FILL01TB	FILL02TB
Laboratory Sample Number			HA1485	HA1486	HA1469	HA1470	HA1471	HA1472	HA1487	HA1488	HA1485	HA1475	HA1476	HA1698	HA1699
Sampling Date	Quant	Quant	10/05/89	10/05/89	10/10/89	10/10/89	10/05/89	10/09/89	10/05/89	10/05/89	10/06/89	10/06/89	10/06/89	10/05/89	10/10/89
Dilution Factor	Limit	Limit	1.0	1.0	1.0	1.0	10.0	5.0	10.0	10.0	1.0	10.0	1.0	1.0	1.0
Units	ug/L	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/L	ug/L
<b>PRIORITY POLLUTANT P/T VOLATILE COMPOUNDS</b>															
Benzene	4.4	4.4	4.2 J	28.7 J	4.54 J	1.3 J	1360 J	146 J	10.2 J	115	2.6 J	U	1.11 J	U	U
Bromofom	4.7	4.7	U	U	U	U	U	U	U	U	U	U	U	U	U
Carbon Tetrachloride	2.8	2.8	U	U	U	U	U	U	U	U	U	U	U	U	U
Chlorobenzene	6.0	6.0	U	U	1.9 J	U	410 J	288 J	U	U	U	U	U	U	U
Chlorodibromomethane	3.1	3.1	U	U	U	U	U	U	U	U	U	U	U	U	U
Chloroethane	10	10	R	R	R	R	U	R	U	U	R	U	R	U	U
2-Chloroethylvinyl ether	10	10	U	U	U	U	U	U	U	U	U	U	U	U	U
Chloroform	1.6	1.6	U	U	U	U	U	U	U	U	U	U	U	U	U
Dichlorobromomethane	2.2	2.2	U	U	U	U	U	U	U	U	U	U	U	U	U
Dichlorodifluoromethane	10	10	U	U	U	U	U	U	U	U	U	U	U	U	U
1,1-Dichloroethane	4.7	4.7	U	U	U	U	U	U	U	U	U	U	U	U	U
1,2-Dichloroethane	2.8	2.8	U	U	5.35 J	U	U	U	U	U	U	U	U	U	U
1,1-Dichloroethene	2.8	2.8	U	U	11.4 J	U	33.8	U	62.2	131	U	U	U	U	U
1,2-Dichloropropane	6.0	6.0	U	U	U	U	U	U	U	U	U	U	U	U	U
cis-1,3-Dichloropropene	5.0	5.0	U	U	U	U	U	U	U	U	U	U	U	U	U
Ethylbenzene	7.2	7.2	U	U	1.7 J	U	25 J	37.5 J	U	16 J	U	U	1.22 J	U	U
Methyl bromide	10	10	U	U	U	U	U	U	U	U	U	U	U	U	U
Methyl chloride	10	10	U	U	U	U	U	U	U	U	U	U	U	U	U
Methylene Chloride	2.8	2.8	77.8 BJ	27.3 BJ	52.6 BJ	28.6 BJ	1160 B	136 BJ	144	391	29.1 JB	1060 JB	55.3 B	20.3 JB	15.4 JB
1,1,2,2-Tetrachloroethane	4.1	4.1	U	U	U	U	U	U	U	U	U	U	U	U	U
Tetrachloroethene	4.1	4.1	U	U	U	U	U	U	U	U	U	U	U	U	U
Toluene	6.0	6.0	2.8 JB	1.8 JB	10.3 J	3.3 J	421 J	155 J	U	60 J	1.4 JB	U	3.05 JB	U	U
1,2-Dichloroethene (trans)	1.6	1.6	U	U	U	U	U	U	U	18.6	U	U	2.23 J	U	U
1,1,1-Trichloroethane	3.8	3.8	U	U	U	U	U	U	U	U	U	U	U	U	U
1,1,2-Trichloroethane	5.0	5.0	U	U	12.4 J	U	U	U	U	U	U	U	U	U	U
Trichloroethene	1.9	1.9	U	U	1.9 J	3.84 J	U	U	U	21.1	U	U	4.47 J	U	U
Trichlorofluoromethane	10	10	5.0 J	U	5.0 J	U	21 J	U	U	26 J	1.5 J	312 J	3.22 J	U	U
Vinyl Chloride	10	10	U	U	U	U	218	U	430	516	U	U	U	U	U
trans-1,3-Dichloropropene	10	10	U	U	U	U	U	U	U	U	U	U	U	U	U

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number			B304F1	B304F2	G318F1	G318F2	P319F1	P319F2	G330F1	G330F2	G337F1	G337F2	G337F2DUP	FILL01TB	FILL02TB
Laboratory Sample Number			HA1485	HA1486	HA1469	HA1470	HA1471	HA1472	HA1487	HA1488	HA1465	HA1475	HA1476	HA1698	HA1699
Sampling Date	Quant	Quant	10/05/89	10/05/89	10/10/89	10/10/89	10/05/89	10/09/89	10/05/89	10/05/89	10/06/89	10/06/89	10/06/89	10/05/89	10/10/89
Dilution Factor	Limit	Limit	1.2	1.3	1.2	1.2	1.2	14	1.4	1.3	12	1.1	1.0	1.0	1.0
Units	ug/L	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/L	ug/L
PRIORITY POLLUTANT ACID EXTRACTABLE COMPOUNDS															
2-Chlorophenol	3.9	340	U	U	U	U	U	U	160 J	204 J	U	U	U	NA	NA
2,4-Dichlorophenol	3.2	280	U	U	U	U	U	U	U	358	U	U	U	NA	NA
2,4-Dimethylphenol	3.2	280	U	U	U	U	U	U	U	U	U	U	U	NA	NA
4,6-Dinitro-2-methylphenol	29	2400	U	U	U	U	U	U	U	U	U	U	U	NA	NA
2,4-Dinitrophenol	50	4300	U	U	U	U	U	U	U	U	U	U	U	NA	NA
2-Nitrophenol	4.3	370	U	U	U	U	U	U	U	U	U	U	U	NA	NA
4-Nitrophenol	2.9	240	U	U	U	U	U	U	U	U	U	U	U	NA	NA
4-Chloro-3-methylphenol	3.6	310	U	U	U	U	U	U	U	U	U	U	U	NA	NA
Pentachlorophenol	4.3	370	U	U	U	U	U	U	U	U	U	U	U	NA	NA
Phenol	1.8	150	146 J	U	U	U	U	U	U	157 J	U	U	U	NA	NA
2,4,6-Trichlorophenol	3.2	280	U	U	U	U	U	U	U	U	U	U	U	NA	NA

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number	Quant	Quant	B304F1	B304F2	G318F1	G318F2	P319F1	P319F2	G330F1	G330F2	G337F1	G337F2	G337F2DUP	FILL01TB	FILL02TB
Laboratory Sample Number	Limit	Limit	HA1485	HA1486	HA1469	HA1470	HA1471	HA1472	HA1487	HA1488	HA1465	HA1475	HA1476	HA1698	HA1699
Sampling Date			10/05/89	10/05/89	10/10/89	10/10/89	10/05/89	10/09/89	10/05/89	10/05/89	10/06/89	10/06/89	10/06/89	10/05/89	10/10/89
Dilution Factor	ug/L	ug/Kg	1.2	1.3	1.2	1.2	1.2	14	1.4	1.3	12	1.1	1.0	1.0	1.0
Units	ug/L	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/L	ug/L
PRIORITY POLLUTANT BASE/NEUTRAL EXTRACTABLE COMPOUNDS															
Acenaphthene	2.3	220	157 J	369	U	482	U	UJ	285	452	1580 J	U	U	NA	NA
Acenaphthylene	4.2	410	U	U	U	U	U	UJ	76 J	77 J	U	U	U	NA	NA
Anthracene	2.3	220	180 J	893	U	604	U	2283 J	1010	1530	U	U	U	NA	NA
Benzo(a)anthracene	9.3	910	375 J	1510	U	1120	236 J	4800 J	3500	3580	U	UJ	211 J	NA	NA
Benzo(a)pyrene	3.0	290	UJ	1150	U	1200	202 J	4930 J	2780	2910	U	UJ	208 J	NA	NA
Benzo(b)fluoranthene	5.7	560	UJ	755	U	962 J	175 J	3511 J	2050	2010	U	UJ	193 J	NA	NA
Benzo(g,h,i)perylene	4.9	480	UJ	UJ	U	826 J	163 J	2586 J	2830 J	2700 J	U	UJ	UJ	NA	NA
Benzo(k)fluoranthene	3.0	290	UJ	965	U	904 J	228 J	4330 J	1800	2050	U	UJ	173 J	NA	NA
bis(2-Chloroethoxy)methane	6.3	620	U	U	U	U	U	UJ	U	U	U	U	U	NA	NA
Bis(2-chloroethyl) ether	6.8	660	U	U	U	U	U	UJ	U	U	U	U	U	NA	NA
bis(2-chloroisopropyl) ether	6.8	660	U	U	U	U	U	UJ	U	U	U	U	U	NA	NA
bis(2-Ethylhexyl)phthalate	12	1200	1140 J	1540 J	2860 B	UJ	U	UJ	1750 J	3370 J	U	UJ	UJ	NA	NA
4-Bromophenylphenyl ether	2.3	220	U	U	U	U	U	UJ	U	U	U	U	U	NA	NA
Butylbenzylphthalate	12	1200	UJ	UJ	U	UJ	U	UJ	UJ	UJ	U	UJ	UJ	NA	NA
2-Chloronaphthalene	2.3	220	U	U	U	U	U	UJ	U	U	U	U	U	NA	NA
4-Chlorophenylphenyl ether	5.0	490	U	U	U	U	U	UJ	U	U	U	U	U	NA	NA
Chrysene	3.0	290	392 J	1400	U	1080 J	232 J	5280 J	3180	3180	3280	UJ	199 J	NA	NA
Dibenz(a,h)anthracene	3.0	290	UJ	UJ	U	UJ	U	UJ	UJ	UJ	U	UJ	UJ	NA	NA
1,2-Dichlorobenzene	2.3	220	U	U	U	U	U	UJ	U	U	U	U	U	NA	NA
1,3-Dichlorobenzene	2.3	220	U	U	U	U	U	UJ	U	U	U	U	U	NA	NA
1,4-Dichlorobenzene	5.2	510	U	U	U	U	U	UJ	U	U	U	U	U	NA	NA
3,3'-Dichlorobenzidine	19.6	1920	UJ	U	U	U	U	UJ	U	U	U	U	U	NA	NA
Diethylphthalate	12	1200	U	U	U	U	U	UJ	U	U	U	U	U	NA	NA
Dimethylphthalate	12	1200	U	U	U	U	U	UJ	U	U	U	U	U	NA	NA
Di-n-butylphthalate	12	1200	503 J	1910	U	U	U	UJ	280 J	552 J	U	U	U	NA	NA
2,4-Dinitrotoluene	6.8	660	U	U	U	U	U	UJ	U	U	U	U	U	NA	NA
2,6-Dinitrotoluene	2.3	220	U	U	U	U	U	UJ	U	U	U	U	U	NA	NA
Di-n-octylphthalate	12	1200	UJ	3350	U	UJ	U	UJ	U	U	U	UJ	UJ	NA	NA
Fluoranthene	2.6	260	731 J	3300	U	2020	385	9480 J	6170	6880	5120	UJ	301 J	NA	NA
Fluorene	2.3	220	180 J	560	U	686	U	UJ	414	606	1215 J	U	U	NA	NA
Hexachlorobenzene	2.3	220	U	U	U	U	U	UJ	U	U	U	U	U	NA	NA
Hexachlorobutadiene	1.1	100	U	U	U	U	U	UJ	U	U	U	U	U	NA	NA
Hexachlorocyclopentadiene	12	1200	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	NA	NA
Hexachloroethane	1.9	190	U	U	U	U	U	UJ	U	U	U	U	U	NA	NA
Indeno(1,2,3-cd)pyrene	4.4	430	UJ	UJ	U	330 J	U	UJ	969 J	956 J	U	UJ	UJ	NA	NA
Isophorone	2.6	260	U	U	U	U	U	UJ	U	U	U	U	U	NA	NA
Naphthalene	1.9	190	264	263	U	1180	138 J	1734 J	1030	110	1465 J	UJ	298 J	NA	NA
Nitrobenzene	2.3	220	U	U	U	UJ	U	UJ	U	U	UJ	UJ	UJ	NA	NA
N-Nitroso-dimethylamine	12	1200	U	U	U	U	U	UJ	U	U	U	U	U	NA	NA
N-Nitroso-di-n-propylamine	12	1200	UJ	UJ	U	U	U	UJ	UJ	UJ	U	U	U	NA	NA
N-Nitroso-diphenylamine	2.3	220	U	U	U	U	U	UJ	U	U	U	U	U	NA	NA
Phenanthrene	6.4	630	806 J	3560	U	2930	1460 J	6054 J	3680	6360	6200 J	181 J	260 J	NA	NA
Pyrene	2.3	220	584 J	2610	U	1560 J	U	7760	5030	5260	4810	UJ	275 J	NA	NA
1,2,4-Trichlorobenzene	2.3	220	U	U	U	U	U	UJ	U	U	U	U	U	NA	NA

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number	Quant	Quant	B304F1	B304F2	G318F1	G318F2	P319F1	P319F2	G330F1	G330F2	G337F1	G337F2	G337F2DUP	FILL01TB	FILL02TB
Laboratory Sample Number	Limit	Limit	HA1485	HA1486	HA1469	HA1470	HA1471	HA1472	HA1487	HA1488	HA1465	HA1475	HA1476	HA1698	HA1699
Sampling Date	ug/L	ug/Kg	10/05/89	10/05/89	10/10/89	10/10/89	10/05/89	10/09/89	10/05/89	10/05/89	10/06/89	10/06/89	10/06/89	10/05/89	10/10/89
Dilution Factor			3.7	4.0	3.5	3.7	3.6	4.2	4.0	3.9	3.6	3.5	3.4	1.0	1.0
Units			ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/L	ug/L
PESTICIDES															
Aldrin	0.05	1.7	U	U	U	U	U	U	U	U	U	U	U	NA	NA
Alpha-BHC	0.05	1.7	U	U	U	U	U	U	U	U	U	U	U	NA	NA
Beta-BHC	0.05	1.7	U	U	U	U	U	U	U	U	U	U	U	NA	NA
Gamma-BHC (Lindane)	0.05	1.7	U	U	U	U	U	U	U	U	U	U	U	NA	NA
Delta-BHC	0.05	1.7	U	U	U	U	U	U	U	U	U	U	U	NA	NA
Chlordane	1.0	33	U	U	U	U	U	U	U	U	U	U	U	NA	NA
4,4'-DDT	0.10	3.3	U	U	U	U	U	U	U	U	U	U	U	NA	NA
4,4'-DDE	0.10	3.3	U	U	U	U	U	U	29 J	U	U	U	U	NA	NA
4,4'-DDD	2.5	83	U	U	U	U	48.5	36.8	U	U	U	U	U	NA	NA
Dieldrin	0.10	3.3	U	U	U	U	U	U	31.1	U	U	U	U	NA	NA
Endosulfan I	0.05	1.7	U	U	U	U	U	U	U	U	U	U	U	NA	NA
Endosulfan II	0.10	3.3	U	U	U	U	U	U	U	U	U	U	U	NA	NA
Endosulfan Sulfate	0.10	3.3	U	U	U	U	U	U	U	U	U	U	U	NA	NA
Endrin	0.10	3.3	U	U	U	U	U	U	U	U	U	U	U	NA	NA
Endrin Aldehyde	0.10	3.3	U	U	U	U	U	U	U	U	U	U	U	NA	NA
Heptachlor	0.05	1.7	U	U	U	U	U	U	U	U	U	U	U	NA	NA
Heptachlor Epoxide	0.05	1.7	U	U	U	U	U	U	U	U	U	U	U	NA	NA
Toxaphene	2.0	65	U	U	U	U	U	U	U	U	U	U	U	NA	NA
Arochlor-1016	0.55	18	U	U	U	U	U	U	U	U	U	U	U	NA	NA
Arochlor-1221	0.55	18	U	U	U	U	U	U	U	U	U	U	U	NA	NA
Arochlor-1232	0.55	18	U	U	U	U	U	U	U	U	U	U	U	NA	NA
Arochlor-1242	0.55	18	U	U	U	U	U	U	U	U	U	U	U	NA	NA
Arochlor-1248	0.55	18	U	U	U	U	U	U	U	U	U	U	U	NA	NA
Arochlor-1254	1.0	33	U	U	U	U	U	U	U	U	U	U	U	NA	NA
Arochlor-1260	1.0	33	U	U	U	U	U	U	U	U	U	U	U	NA	NA

continued next page (see last page of table for notes)

**TABLE 2 (continued)**  
**SUMMARY OF ANALYTICAL RESULTS**  
**PHASE I INVESTIGATION**  
**CHEMICAL WASTE MANAGEMENT**  
**CHICAGO, ILLINOIS**

Dames and Moore Sample Number Laboratory Sample Number Sampling Date Units	Quant Limit ug/L	Quant Limit ug/Kg	B304F1 HA1485 10/05/89 ug/Kg	B304F2 HA1486 10/05/89 ug/Kg	G318F1 HA1489 10/10/89 ug/Kg	G318F2 HA1470 10/10/89 ug/Kg	P319F1 HA1471 10/05/89 ug/Kg	P319F2 HA1472 10/09/89 ug/Kg	G330F1 HA1487 10/05/89 ug/Kg	G330F2 HA1488 10/05/89 ug/Kg	G337F1 HA1465 10/06/89 ug/Kg	G337F2 HA1475 10/06/89 ug/Kg	G337F2DUP HA1476 10/06/89 ug/Kg	FILL01TB HA1698 10/05/89 ug/L	FILL02TB HA1699 10/10/89 ug/L
<b>PRIORITY POLLUTANT INORGANIC PARAMETERS (METALS)</b>															
Antimony	60	6000	BMDL J	9100	7300	BMDL J	BMDL J	9000	BMDL J	BMDL J	BMDL J	8200	BMDL J	NA	NA
Arsenic	10	1000	6700	17000	5200	11000	5600 J	11000 J	12000	7800	6000	7100	7400	NA	NA
Beryllium	1.0	100	810	860	510	640	680	570	640	880	640	560	440	NA	NA
Cadmium	2.0	200	1400	2400	1500	2000	2000	1700	1600	1800	2200	1800	1800	NA	NA
Chromium	10	1000	18000	29000	41000	23000	20000	22000	23000	56000	16000	15000	12000	NA	NA
Copper	10	1000	29000	44000	21000	29000	35000	40000	38000	38000	36000	34000	25000	NA	NA
Lead	5.0	500	18000	120000	11000	95000	20000	470000	130000	56000	120000	18000	22000	NA	NA
Mercury	0.20	80	150	160	BMDL J	140	BMDL J	160	140	120	190	BMDL J	BMDL J	NA	NA
Nickel	20	1000	31000	36000	23000	27000	32000	15000	24000	20000	25000	31000	22000	NA	NA
Selenium	5.0	500	U	U	UJ	UJ	UJ	UJ	BMDL J	BMDL J	UJ	BMDL J	UJ	NA	NA
Silver	10	1000	1400	1800	2000	2700	2300	1900	1800	1500	2800	1900	2000	NA	NA
Thallium	10	1000	BMDL J	BMDL J	U	BMDL J	BMDL J	U	BMDL J	BMDL J	BMDL J	BMDL J	BMDL J	NA	NA
Zinc	20	2000	46000	240000	50000	74000	65000	250000	110000	120000	150000	52000	79000	NA	NA
	mg/L	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg		
Cyanide, total	0.010	0.5	U	U	U	U	U	U	U	U	U	U	U	NA	NA
Phenols, total	0.10	3.0	U	U	U	U	U	U	U	U	U	U	U	NA	NA

**LEGEND:**

- U Compound was not detected at laboratory method detection limit.
  - J Estimated value due to limitations identified during the quality assurance review.
  - UJ Reported method detection limit is estimated due to limitations identified during the quality assurance review.
  - B Compound was detected in a laboratory and/or field blank at similar concentrations. May represent laboratory and/or field contamination.
  - R Unreliable result. Compound may or may not be present.
  - \* Sample analyzed at multiple dilutions. Summary table is a hybrid of diluted and undiluted results.
  - No standard available. Compound was qualitatively searched for.
  - IND Indeterminate. Standard and/or spikes could not be detected at method detection limit.
  - BMDL Below Method Detection Limit reported by laboratory.
- Discrepancies may exist between the laboratory data tables and the data validation summary tables due to variations in the rounding of calculations.

TABLE 2  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number			VAULT	FILL01EB	01TB	FILL02EB
Laboratory Sample Number			HA1526	HA1519	HA1529	HA1518
Sampling Date	Quant	Quant	10/06/89	10/05/89	10/06/89	10/10/89
Dilution Factor	Limit	Limit	1.0	NA	1.0	1.0
Units	ug/L	ug/Kg	ug/Kg	ug/L	ug/L	ug/L
APPENDIX IX HEATED P/T VOLATILE COMPOUNDS						
Acetonitrile	15	15	U	NA	U	U
Acrolein	20	20	U	NA	U	U
Acrylonitrile	10	10	U	NA	U	U
1,4-Dioxane	300	300	U	NA	U	U
Ethyl cyanide	40	40	U	NA	U	U
Isobutyl alcohol	230	230	2.6 J	NA	U	U
Methacrylonitrile	110	110	U	NA	U	U

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number Laboratory Sample Number Sampling Date Dilution Factor Units	Quant Limit ug/L	Quant Limit ug/Kg	VAULT HA1526 10/06/89 100 ug/Kg	FILL01EB HA1519 10/05/89 1.0 ug/L	01TB HA1529 10/06/89 1.0 ug/L	FILL02EB HA1518 10/10/89 1.0 ug/L
APPENDIX IX P/T VOLATILE COMPOUNDS						
Benzene	4.4	4.4	1750	U	U	U
Methyl bromide	4.7	4.7	UJ	U	UJ	U
Carbon disulfide	10	10	U	U	U	U
Chloroethane	6.0	6.0	U	U	U	U
Chlorobenzene	-	-	1050	U	U	U
2-Chloro-1,3-butadiene	3.1	3.1	U	U	U	U
Chloroform	10	10	U	U	U	U
Methyl chloride	1.6	1.6	U	UJ	U	U
3-Chloropropene	10	10	U	U	U	U
1,2-Dibromo-3-chloropropan	2.2	2.2	U	U	U	U
1,2-Dibromoethane	10	10	U	U	U	U
Dibromoethane	10	10	U	U	U	U
1,4-Dichloro-2-butene	10	10	UJ	UJ	UJ	U
Dichlorodifluoromethane	10	10	U	UJ	U	U
1,1-Dichloroethane	4.7	4.7	35.9 J	U	U	U
1,2-Dichloroethane	2.8	2.8	743	U	U	U
1,2-Trans-dichloroethene	1.6	1.6	U	U	U	U
1,1-Dichloroethene	2.8	2.8	5790	U	U	U
Methylene Chloride	5.0	5.0	4390 B	4.03 B	6.06 B	U
1,2-Dichloropropane	10	10	U	U	U	U
cis-1,3-Dichloropropene	7.2	7.2	U	U	U	U
trans-1,3-Dichloropropene	10	10	U	U	U	U
Chlorodibromomethane	10	10	U	U	U	U
Dichlorobromomethane	10	10	U	U	U	U
Ethyl methacrylate	10	10	U	U	U	U
Iodomethane	10	10	UJ	U	UJ	U
Methyl ethyl ketone	2.8	2.8	R	R	R	U
Methyl methacrylate	10	10	U	U	U	U
Pentachloroethane	10	10	U	U	U	U
1,1,2,2-Tetrachloroethane	10	10	U	U	U	U
1,1,2,2-Tetrachloroethane	-	-	U	U	U	U
Tetrachloroethene	10	10	U	U	U	U
Carbon tetrachloride	4.1	4.1	U	U	U	U
Toluene	4.1	4.1	6210	U	U	U

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number			VAULT	FILL01EB	01TB	FILL02EB
Laboratory Sample Number			HA1526	HA1519	HA1529	HA1518
Sampling Date	Quant	Quant	10/06/89	10/05/89	10/06/89	10/10/89
Dilution Factor	Limit	Limit	100	1.0	1.0	1.0
Units	ug/L	ug/Kg	ug/Kg	ug/L	ug/L	ug/L
APPENDIX IX P/T VOLATILE COMPOUNDS (continued)						
Bromoform	6.0	6.0	U	U	U	U
1,1,1-Trichloroethane	1.6	1.6	2980	U	U	U
1,1,2-Trichloroethane	3.8	3.8	U	U	U	U
Trichloroethene	5.0	5.0	U	U	U	U
Trichlorofluoromethane	10	10	UJ	UJ	UJ	U
1,2,3-Trichloropropane	1.9	1.9	U	U	U	U
Vinyl Chloride	10	10	3640	U	U	U
Acetone	10	10	8480	12.7 B	25.5 B	U
Ethylbenzene	7.2	7.2	628 J	U	U	U
2-Hexanone	10	10	U	U	U	U
Methyl isobutyl ketone	10	10	2760	U	U	U
Styrene	10	10	U	U	U	U
Vinyl acetate	10	10	U	U	U	U
m-Xylene	10	10	988 J	U	U	U
o,p-Xylenes	10	10	800 J	U	U	U

LEGEND:

- U Compound was not detected at laboratory method detection limit.
  - J Estimated value due to limitations identified during the quality assurance review.
  - UJ Reported method detection limit is estimated due to limitations identified during the quality assurance review.
  - B Compound was detected in a laboratory and/or field blank at similar concentrations. May represent laboratory and/or field contamination.
  - R Unreliable result. Compound may or may not be present.
  - \* Sample analyzed at multiple dilutions. Summary table is a hybrid of diluted and undiluted results.
  - No standard available. Compound was qualitatively searched for.
  - NA Not analyzed
  - NP Not provided
  - IND Indeterminate. Standard and/or spikes could not be detected at method detection limit.
  - BMDL Below Method Detection Limit reported by laboratory.
- Discrepancies may exist between the laboratory data tables and the data validation summary tables due to variations in the rounding of calculations.





**DATA VALIDATION/QUALITY ASSURANCE REVIEW  
PHASE I RCRA FACILITY INVESTIGATION  
CHEM-WASTE MANAGEMENT, INC. - CHICAGO INCINERATOR SITE  
SAMPLE COLLECTION DATES: OCTOBER 10 THROUGH 18, 1989  
DAMES & MOORE JOB NO.: 13963-055-192**

**LABORATORY REPORT NO.: 350229, 350231, 350233, 350237 & 350238**

**INTRODUCTION**

Twelve (12) soil samples plus three (3) field-duplicate soil samples, twenty one (21) sediment samples plus five (5) duplicate sediment samples, five (5) equipment and/or field-blank samples and five (5) trip-blank samples were collected and submitted to Environmental Testing and Certification (ETC) of Edison, New Jersey (1992 Illinois Certification No. 100224). The samples included in the review are listed on Table 1. Forty one (41) samples were analyzed for Priority Pollutant (PP) Volatile Organic Compounds (VOA), Semivolatile Organic Compounds (BNA), Organochlorine Pesticides and Polychlorinated Biphenyls (PCBs), metals, total cyanide (CN) and total phenol. The equipment blank was analyzed for RCRA Appendix IX heated purge and trap (HP/T) VOAs and Appendix IX purge and trap VOAs. The trip-blank samples were analyzed for PP VOAs only. All samples were analyzed following USEPA SW-846 Methodologies.

Data were examined to assess the usability of the results. The organic data quality review is based upon a rigorous review of the reported hold times, surrogate recovery results, blank spike recoveries, matrix spike and matrix spike duplicate analyses, blank contaminants, internal standard area performance, Gas Chromatography/Mass Spectroscopy (GC/MS) tuning and calibration data.

The inorganic and conventional parameter findings offered in this report are based upon review of the reported hold times, blank analysis results, blank spike recoveries, matrix spike recoveries, duplicate results, instrument calibration verification, post-digestion spike recoveries and Inductively Coupled Plasma (ICP) serial dilution analyses.

The analytical data was presented in an ETC Abbreviated Data Format as requested by Chemical Waste Management, Inc. The laboratory retrieved the archived support documentation for the data validation review; however, not all support documentation was retrievable by the laboratory. Therefore, a quality assurance review rather than data validation is provided for select data points. The quality assurance reviews are not as rigorous as quantitative data validation and for these data, the quality assurance review assumes the analytical results are correct as reported and merely provides an interpretation of the reported quality control results.

Details of the data validation/quality assurance review are presented in the narrative section of the report. The data is summarized in Table 2 of the report. Data qualifiers have been placed next to the results so that the data user can quickly assess the qualitative and/or quantitative reliability of the reported result. This report was prepared to provide a critical review of the laboratory analysis and reported chemical results. Quality assurance reviews of laboratory-generated data routinely identify problems associated with analytical measurements, even from the most experienced and capable laboratories.

This review has been performed in accordance with the requirements specified in the "Laboratory Data Validation Functional Guidelines for Evaluating Organic Analyses" dated February 1988 and "Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses" dated July 1988.

**TABLE 1**  
**SAMPLES INCLUDED IN REVIEW**

<u>Sample ID</u>	<u>Lab ID</u>	<u>Collection Date</u>	<u>Analyses Requested*</u>
<u>Laboratory Log Link No. 350229</u>			
SG303F1	HA1473	10/10/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
SG303F2	HA1474	10/11/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
S27	HA1540	10/11/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
S26	HA1541	10/11/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
S8	HA1543	10/11/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
SEDIME01FB	HA1573	10/11/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
SEDIME01TB	HA1740	10/11/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
<u>Laboratory Log Link No. 350231</u>			
B301F1	HA1491	10/12/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
B301F1-Dup	HA1492	10/12/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
S5	HA1532	10/12/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
S4	HA1533	10/12/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
S17	HA1534	10/12/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
S17-Dup	HA1535	10/12/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
S25	HA1550	10/11/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
S1	HA1551	10/11/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
S18	HA1554	10/12/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
S18-Dup	HA1555	10/12/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
SEDIME02FB	HA1571	10/12/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
SEDIME03FB	HA1572	10/12/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
SEDIME02TB	HA1741	10/12/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
SEDIME03TB	HA1742	10/12/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols

<u>Sample ID</u>	<u>Lab ID</u>	<u>Collection Date</u>	<u>Analyses Requested*</u>
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Laboratory Log Link No. 350233

B301F2-Dup	HA1464	10/12/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
B301F2	HA1466	10/12/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
G302F1	HA1499	10/12/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
G302F2	HA1500	10/12/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
FILL03EB	HA1521	10/12/89	HP/T VOA, VOA, BNA, Pest/PCBs, Metals, CN & Phenols
S2	HA1536	10/12/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
S2-Dup	HA1537	10/12/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
S3	HA1538	10/12/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
S3-Dup	HA1539	10/12/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
S7	HA1563	10/12/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
FILL03TB	HA1700	10/12/89	PP VOA

Laboratory Log Link No. 350237

G342F2	HA1497	10/13/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
G342F1	HA1498	10/13/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
S21	HA1546	10/13/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
S21-Dup	HA1547	10/13/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
S28	HA1548	10/13/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
S29	HA1549	10/13/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
S22	HA1556	10/13/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
S23	HA1557	10/13/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
S19	HA1558	10/13/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
S20	HA1559	10/13/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
S24	HA1564	10/13/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
S25	HA1565	10/13/89	PP VOA, BNA, Pest/PCBs, CN & Phenols
SEDIME04FB	HA1568	10/13/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
SEDIME04TB	HA1743	10/13/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
S25	HA1920	10/18/89	Metals

Laboratory Log Link No. 350238

G344F1	HA1467	10/16/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
G344F2	HA1468	10/16/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
G308F1	HA1483	10/16/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
G308F2	HA1484	10/16/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols

LEGEND:

PP VOA	=	Priority Pollutant Volatile Organic Compounds
HP/T VOA	=	RCRA Appendix IX Heated Purge & Trap Volatile Organic Compounds
VOA	=	RCRA Appendix IX Volatile Organic Compounds
PP BNA	=	Priority Pollutant Semi-volatile Organic Compounds
PP Pest/PCB	=	Priority Pollutant Organochlorine Pesticides and Polychlorinated Biphenyls
PP Metals	=	Priority Pollutant Inorganic Parameters
CN	=	Total Cyanide
Phenols	=	Total Phenol

## DATA QUALIFIERS

The data validation review has identified aspects of the analytical data that require qualification. To confidently use any of the data within the data set, the data user should understand the limitations and qualifications presented. With regard to data usability, the following qualifiers are offered based upon the data provided.

### ORGANIC QUALIFIERS

#### Hold Times:

- Sample FILL03EB (LL 350233), was analyzed for heated purge & trap volatile organic compounds 2 days outside the recommended hold time. There is no impact on data usability and no qualifier has been applied.
- Samples B301F1-Dup, S1, S5, S17, S17-Dup, S25 (Log Link 350231), B301F2-Dup, B301F2, FILL03EB, S2, S2-Dup, S3 (LL 350233), G342F2, S21, S19, S24 and S29 (LL 350237) were analyzed for volatile organic compounds 1 to 4 days outside the recommended hold time. There is no impact on data usability and no qualifier has been applied.
- Samples G303F1, G303F2, SEDIME01TB (LL 350229), S4 and S18 (LL 350231) were analyzed for volatile organic compounds 5 to 14 days outside hold time. The positive and non-detected results may be biased low and have been flagged (J/UJ) estimate on Table 2.
- Samples SEDIME01FB (LL 350229), SEDIME02FB, SEDIME03FB (LL 320231), SEDIME04FB, S25 (LL 250237) and G308F1 (Log Link 350238) were extracted for semi-volatile organic compounds 21 to 31 days outside the recommended hold time. The positive results may be biased low and have been flagged (J) estimated. The non-detected results are unreliable (compound may or may not be present) and have been flagged (R) on Table 2.

#### Blank Contamination:

- Due to the trace presence of the following volatile organic compounds in the associated laboratory and/or field blank samples, positive results of these compounds in the field samples are qualitatively questionable and have been flagged (B) on Table 2. Reported concentrations which are greater than 5 times the blank concentration (10 times for methylene chloride) are regarded as "real" values and no qualifier is applied.

<u>Analyte</u>	<u>Log Link</u>	<u>Associated Samples</u>
Methylene chloride	350229	G303F1, G303F2, SEDIME01TB
	350231	All field samples except SEDIME02FB and SEDIME03FB
	350233	S3-Dup, B301F2, B301F2-Dup, FILL03FB
	350237	All field samples
	350238	All field samples
Toluene	350229	G303F1, S5
	350233	S3-Dup
Benzene	350229	G303F2
	350231	S4
Dichlorodifluoromethane	350229	SEDIME01TB
	350231	SEDIME02TB, SEDIME03TB
	350233	FILL03FB
1,1,1-Trichloroethane	350231	All field samples except SEDIME02FB and SEDIME03FB
	350233	S3-Dup, B301F2

- Due to the trace presence of the following semi-volatile organic compounds in the associated laboratory and/or field blank samples, positive results for these compounds in the field samples are qualitatively questionable and have been flagged (B) on Table 2. Positive concentrations which are greater than five times the blank concentrations (ten times for phthalates) are regarded as "real" values and no qualifier is applied.

<u>Analyte</u>	<u>Log Link</u>	<u>Associated Samples</u>
Bis(2-Ethylhexyl)-phthalate	350229	All Field Samples
	350231	B301F1, B301F1-Dup, S4, S17, S17-Dup, S25, SEDIME02FB, SEDIME03FB
	350233	B301F2, B301F2-Dup
	350237	SEDIME04FB, S25
Di-n-butyl phthalate	350229	SEDIME01FB
	350231	SEDIME02FB, SEDIME03FB
	350238	SEDIME04FB

#### Surrogate Recoveries:

- All volatile surrogate compound recoveries fell within acceptable control limits.
- The base/neutral semi-volatile surrogate compound, terphenyl-d14, fell outside control limits (high) for samples S18, S18-Dup (LL 350231),

G302F2, S2, S2-Dup, S3, S3-Dup, S7 (LL 350233) S19, S20, S21, S22, S23, S28, S29 (LL 350237), and G344F2 (LL 350238). No qualifier is required since only one surrogate per fraction fell outside control limits.

- The base/neutral semi-volatile surrogate compound, 2-fluorobiphenyl, fell outside control limits (high) for sample G308F2 (LL 350338). The positive results may be biased high; however, no qualifier is required since only one surrogate per fraction fell outside control limits.
- Two acid semi-volatile surrogate compounds, phenol-d5 and 2-fluorophenol, fell outside control limits (high) for sample B308F2 (LL 350238). Positive acid extractable results may be biased high and have been flagged (J) on Table 2. There is no impact on the non-detected values and no qualifier has been applied.
- For the pesticide/PCB analyses, the surrogate compounds tetrachloromethyl-xylene (TCMX) and dibutylchlorodate (DBC), fell outside control limits (high) for sample S25 (LL 350237). The positive results may be biased high and have been flagged (J) on Table 2. There is no impact on the non-detected results and no qualifiers are applied.
- For several pesticide/PCB analyses, the surrogate compound dibutylchlorodate (DBC) fell outside control limits (high). No qualifier is required however, since only one surrogate fell outside control limits.

#### Initial and Continuing Calibration Results:

- The base/neutral/acid extractable support documentation for samples B303F2, G303F1 (LL 350229), B301F1, B301F1-Dup, S4 (LL 350231) and B301F2 (LL 350233) could not be located in hardcopy or magnetic tape by the laboratory. Therefore, no comments are offered regarding the quantitative validity of the reported results. The results for the aforementioned samples are assumed to be correct as reported by the laboratory and any data biases (high or low) were noted based upon an evaluation of the limited data provided.
- Due to the high difference between the initial and continuing calibration response factors (%D >35% and <90%), all positive results for the following volatile compounds have been flagged (J) estimated. The actual detection limit may be higher than reported and has been flagged (UJ) estimated in Table 2.

<u>Analyte</u>	<u>Log Link</u>	<u>Associated Samples</u>
Acetone, Methylene chloride, Chloroethane & 1,2-Dichloroethane	350233	FILL03EB
Bromomethane	350229 350231 350233	G303F2 B301F1, B301F1-Dup, S1, S8-Dup, S17, S17-Dup, S18, S25 B301F2-Dup
Bromoform	350233 350238	S3-Dup, B301F2 G342F2
Chloromethane	350229 350233 350237 350238	SEDIME01FB S3-Dup, B301F2 SEDIME04FB, G342F2 All Field Samples
2-Chloroethylvinyl ether	350229	SEDIME01TB
cis-1,3-Dichloropropene & 1,2-Dichloropropane	350231	S5
Dichlorodifluoromethane	350231 350233	B301F1, B301F1-Dup, S1, S8-Dp, S17, S17-Dup, S@% B301F2-Dup, FILL03FB
Methylene chloride	350233	FILL03EB
Trichloroethene	350229	G303F1
Tetrachloroethene	350237	S19, S23, S21-Dup, S24, S29
Trichlorofluoromethane	350238	All Filed Samples
Vinyl chloride	350233 350237	S3-Dup, B301F2, FILL03EB G342F2, S20, S21, S22, S25, S28, S29

- Due to the extremely high percent difference between the initial and continuing calibration response factors (%D > 90%), positive result for the following volatile and semivolatile compounds have been flagged (J) estimated. The non-detected values are unreliable and have been flagged (R) on Table 2.

<u>Analyte</u>	<u>Log Link</u>	<u>Associated Samples</u>
Bromomethane	350231 350233	SEDIME02TB, SEDIME03TB FILL03FB



<u>Analyte</u>	<u>Log Link</u>	<u>Associated Samples</u>
Chloroethane	350229 350231	F303F1 S5
Carbon disulfide	350233	FILL03FB
Methylene Chloride	350237	S19, S21, S23, S24, S29
Pentachlorophenol	350237 S20	

- Due to the high difference between the initial and continuing calibration response factors (%D >35% and <90%), positive results for the following semi-volatile compounds have been flagged (J) estimated on Table 2.

<u>Analyte</u>	<u>Log Link</u>	<u>Associated Sample</u>
Hexachlorocyclopentadiene	350229 350231 350233	S8, S26, S27 S17, S17-Dup, S18, S18-Dup, S25 G302F2, S2, S2-Dup, S3, S3-Dup, S7
n-Nitroso-dimethylamine	350229 350231 350233	SEDIME01FB SEDIME02FB, SEDIME03FB SEDIME04FB
n-Nitrosodiphenylamine	350237	S20
n-Nitroso-di-propylamine	350231 350233 350238	S1, S5, S18, S18-Dup G302F2, S2, S2-Dup, S3, S3-Dup, S7 G344F2
Isophorone	350238	G344F2
Bis(2-chloroisopropyl)ether	350237	S20
Nitrobenzene	350229 350231 350233	S8, S26, S27 S17, S17-Dup, S18, S18-Dup, S25 B301F2-Dup
Bis(2-ethylhexyl)phthalate Butylbenzyl phthalate Indeno(1,2,3-c,d) pyrene, Dibenzo(a,h)anthracene & Benzo(g,h,i)perylene	350231 350233	S1, S5, S18, S18-Dup G302F2, S2, S2-Dup, S3, S3-Dup, S7
Di-n-butyl phthalate	350233	G302F2, S2, S2-Dup, S3, S3-Dup, S7
4-Nitrophenol	350229 350233	S27 B301F2-Dup

- For the pesticide/PCB analyses, the correlation coefficient for the initial calibration fell within acceptable control limits ( $>0.995$ ) for all samples in LL 250229, 350231, 350233, 350237 and 350238.
- For the pesticide/PCB analyses, the analytical sequence requirements were met. However, since the standard chromatograms were not available for review (quantitation reports only), no comments can be offered regarding an evaluation of the system performance with regards to adequate resolution.
- The DDT/Endrin percent breakdown associated with LL 350229, 350231, 350233, 350237 and 350238 was evaluated and fell within acceptable control limits on the primary column. The combined DDT/Endrin percent breakdown was greater than 30% for select samples in Log Links 350229, 350231, 350233 and 350237 on the confirmatory column; however, there is no impact on data usability since none of the associated samples were positive for either DDT, Endrin, or their breakdown products.

#### Internal Standard Area Performance:

- The laboratory could not be located in hardcopy or magnetic tape the BNA support documentation for samples B303F1, G303F2 (LL 350229), B301F1, B301F1-Dup, S4 (LL 350231) and B301F2 (LL 350233). Therefore, the internal standard area performance cannot be evaluated for these samples.
- The area count of the volatile internal standard, 1,4-difluorobenzene, associated with sample G303F2 (LL 350229), and chlorobenzene-d5, associated with samples S25 (LL 350231), S3-Dup (LL 350233), S21, S21-Dup, S28, S19 and S20 (LL 350237) were reported outside the control limits (low). The positive and non-detected compounds quantitated against this internal standard for these samples may be biased low and have been flagged (J/UJ) estimated on Table 2.
- The area count of the volatile internal standards, difluorobenzene and chlorobenzene-d5, associated with samples S4, S17, S17-Dup, S18-Dup (LL 350231), S22, S23, S25 (LL 350237) and G308F1 (LL 350238) were reported outside the control limits (low). The positive and non-detected compounds quantitated against these internal standards for these samples may be biased low and have been flagged (J/UJ) estimated on Table 2.
- All three volatile internal standards fell outside the control limits (low) for the volatile analysis of samples S1 (LL 3502231), B301F2 (LL 350233), S29, S24 (LL 350237) G344F1, G344F2 and G308F2 (LL 350238). The

positive and non-detected compounds quantitated against these internal standards for these samples may be biased low and have been flagged (J/UJ) estimated on Table 2.

- The area count of the semi-volatile internal standard, perylene-d12, associated with samples B301F2-Dup, G302F2 (LL 350233) and G3342F2 (LL 350237), were reported outside the control limits (low). The positive and non-detected compounds quantitated against these internal standard for these samples may be biased low and have been flagged (J/UJ) estimated on Table 2.
- The area count of the semi-volatile internal standards, phenanthrene-d10, chrysene-d12 and perylene-d12, associated with sample S20 (LL 350237), was reported outside the control limits (low). The positive and non-detected compounds quantitated against this internal standards for this samples may be biased low and have been flagged (J/UJ) estimated on Table 2.
- All six semi-volatile internal standards were reported outside the control limits (low) for samples S17 (LL 350231) and G344F2 (LL 350238). The positive and non-detected compounds quantitated against this internal standards for this samples may be biased low and have been flagged (J/UJ) estimated on Table 2.

#### Matrix Spikes (MS) and Matrix Spike Duplicate (MSD) Results:

- Field duplicate samples were collected and submitted to the laboratory. Overall, the reproducibility of the organic analyses are good, providing a positive indication of the field techniques and laboratory precision associated with these samples. For the duplicate pairs S2 and S2-Dup (LL 250233), the pesticide heptachlor was identified in the field sample and reported as non-detected in the duplicate sample. The poor reproducibility may be due to a lack of sample homogeneity. The positive and non-detected results are regarded as estimated values and have been flagged (J/UJ) on Table 2.

#### Additional Comments:

- As per the requirements, all values calculated below the method detection limit should be considered estimated and have been flagged (J) in Table 2 of this report.

## INORGANIC and CONVENTIONAL PARAMETER QUALIFIERS

### General Comments:

- In the metals fraction, this reviewer has observed that for the ICP concentrations reported at 10 to 15 times above the method detection limit (MDL), the data validation cannot reproduce the laboratory reported results. The calculation obtained during data validation is consistently higher than the laboratory reported concentration. This is due to the fact that the interelement correction factors in the ICP instrument have been externally calculated. Since this external interelement correction factor is not available for review, the reported results for low level samples cannot be reproduced. It should be noted that positive ICP reported results that are significantly above than the MDL were reproduced and validated, since this interelement correction factor becomes negligible at higher concentrations. The data review assumes that the low level reported concentrations are correct as reported and it is this reviewer's opinion that data usability is not impacted.

### Hold Times:

- All samples were digested and analyzed within the required hold time criteria for metals and cyanide. The preparation and analysis date of the total phenols was not available for review; however, based upon the date of report, it appears that the hold time criteria was met for the total phenols analyses as well.

### Blank Contamination:

- Due to the presence of zinc in the field-blank sample SEDIME01FB (LL 350229) and SEDIME04FB (LL 350237), positive zinc results are qualitatively questionable. However, the reported concentrations in the field samples are greater than 5 times the concentration detected in the field-blank sample and are regarded as "real" values. Therefore, no qualifier has been applied.
- Trace concentrations of antimony, lead and zinc were detected in the laboratory blank associated with LL 350233 at concentrations below the method detection limit (BMDL). The positive results of these analytes in the field samples reported as BMDL are qualitatively questionable and have been flagged (B) on Table 2. The positive results reported at or above the method detection limits are regarded as "real" values and no qualifier has been applied. The following samples have been flagged (B) on the summary tables:

<u>Analyte</u>	<u>Log Link</u>	<u>Associated Samples</u>
Antimony	350233	S2
Selenium	350237 S23, S19, S20, S25 350238 G324F1, G324F2	

#### Inductively Coupled Plasma (ICP) Serial Dilution Results:

- The ICP serial dilution analyses of zinc was greater than 10% for sample S5 (LL 350231). The positive zinc result in sample S5 is regarded as estimated and has been flagged (J) on Table 2.
- The ICP serial dilution analyses of lead and zinc were outside control limits (greater than 10%) for sample S4 (LL 350231). The positive lead and zinc results in sample S4 are regarded as estimated and have been flagged (J) on Table 2.
- The ICP serial dilution analyses of cadmium and chromium were outside control limits (greater than 10%) for sample S24 (LL 350237). The positive cadmium and chromium results in sample S24 are regarded as estimated and have been flagged (J) on Table 2.

#### Matrix Spike (MS) and Duplicate (DU) Summary Results:

- The matrix spike recovery of zinc in the spiked sample S5 was outside (low) control limits. No qualifier has been applied since the concentration of this analyte in the unspiked sample was greater than 4 times the spike concentration.
- Due to the high percent difference of arsenic in the duplicate analysis of S5, the positive arsenic results are quantitatively questionable and have been flagged (J) estimated on Table 2.
- Due to the low matrix spike recovery of nickel and antimony in MS sample S4 (LL 350231), the positive results in the unspiked sample may be biased low and have ben flagged (J) on Table 2.
- The matrix spike recoveries of copper zinc, arsenic, potassium, calcium and magnesium in MS sample S4 (LL 350231) were outside control limits (high). The positive copper result in the unspiked sample may be biased high and has been flagged (J) on Table 2. Since the concentration of zinc, arsenic, potassium, calcium and magnesium in the unspiked sample was greater than 4 times the spiking concentration, no qualifier has been applied.

- The matrix spike recovery of arsenic in MS sample S24 (LL 350238) were outside control limits (high). The positive arsenic result in the unspiked sample may be biased high and has been flagged (J) on Table 2.
- The matrix spike recoveries of calcium, potassium and magnesium in MS sample S24 (LL 350238) were outside control limits (high). The positive arsenic results in the unspiked sample may be biased high and has been flagged (J) on Table 2.
- The matrix spike compound, antimony, was not recovered (0%) in MS sample S24 (LL 350238). The non-detected antimony result in the unspiked sample S24 is regarded as unreliable (analyte may or may not be present) and has been flagged (R) on Table 2.
- Field duplicate samples B301F2 and B301F2-Dup, S3 and S3-Dup, S17 and S17-Dup and S21 and S21-Dup were collected and submitted to the laboratory. Overall, the reproducibility of the metals and conventional parameters is good, providing a positive indication of the field and laboratory precision.
- Field duplicate samples S18 and S18-Dup and S2 and S2-Dup were collected and submitted to the laboratory. The reproducibility of the metals and conventional parameters are good with the exception of beryllium, cadmium, lead, silver sodium, and zinc in the duplicate pair of S18 and antimony, cadmium, silver and sodium in duplicate pair S2. The lack of reproducibility may be due to a lack of sample homogeneity. The positive results of the aforementioned compounds in each duplicate pair are regarded as estimated values and have been flagged (J) on Table 2.

#### Post-Digestion Spike Recoveries:

- The post-digestion spike recoveries of the following analytes were outside the control limits (low). Positive and/or non-detected results of these analytes for the associated samples may be biased low and have been flagged (J/UJ) estimated.

<u>Analyte</u>	<u>Log Link</u>	<u>Associated Samples</u>
Selenium	350229	G303F2, S26, S8, S27
	350231	S5, B301F1, B301F1-Dup, S4, S17, S17-Dup, S1, S18, S18-Dup
	350233	S7, S2, S2-Dup, S3, S3-Dup, B301F2, B301F2-Dup
	350237	S21, S21-Dup, S23, S19, S20, S24, G342F1
	350238	G308F1, G308F2

Additional Comments:

- The laboratory reports several inorganic results as below the method detection limit (BMDL). These are reported as BMDL on Table 2. The actual concentrations are not calculated during the data validation review since the interelement coefficient factors were not provided.

TABLE 2  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number			FILL03EB
Laboratory Sample Number			HA1521
Sampling Date			10/12/89
Dilution Factor			1.0
Units	Quant Limit ug/L	Quant Limit ug/Kg	ug/L
APPENDIX IX HEATED P/T VOLATILE COMPOUNDS			
Acetonitrile	15	15	UJ
Acrolein	20	20	UJ
Acrylonitrile	10	10	UJ
1,4-Dioxane	300	300	UJ
Ethyl cyanide	40	40	UJ
Isobutyl alcohol	230	230	UJ
Methacrylonitrile	110	110	UJ

continued next page (see last page of table for notes)



TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number Laboratory Sample Number Sampling Date Dilution Factor Units	Quant Limit ug/L	Quant Limit ug/Kg	FILL03FB HA1521 10/12/89 1.0 ug/L
APPENDIX IX P/T VOLATILE COMPOUNDS			
Benzene	4.4	4.4	U
Methyl bromide	4.7	4.7	R
Carbon disulfide	10	10	R
Chloroethane	6.0	6.0	UJ
Chlorobenzene	—	—	U
2-Chloro-1,3-butadiene	3.1	3.1	U
Chloroform	10	10	U
Methyl chloride	1.6	1.6	U
3-Chloropropene	10	10	U
1,2-Dibromo-3-chloropropane	2.2	2.2	U
1,2-Dibromoethane	10	10	U
Dibromoethane	10	10	U
1,4-Dichloro-2-butene	10	10	U
Dichlorodifluoromethane	10	10	UJ
1,1-Dichloroethane	4.7	4.7	U
1,2-Dichloroethane	2.8	2.8	UJ
1,2-Trans-dichloroethene	1.6	1.6	U
1,1-Dichloroethene	2.8	2.8	U
Methylene Chloride	5.0	5.0	UJ
1,2-Dichloropropane	10	10	U
cis-1,3-Dichloropropene	7.2	7.2	U
trans-1,3-Dichloropropene	10	10	U
Chlorodibromomethane	10	10	U
Dichlorobromomethane	10	10	U
Ethyl methacrylate	10	10	U
Iodomethane	10	10	U
Methyl ethyl ketone	2.8	2.8	U
Methyl methacrylate	10	10	U
Pentachloroethane	10	10	U
1,1,2,2-Tetrachloroethane	10	10	U
1,1,2,2-Tetrachloroethane	—	—	U
Tetrachloroethene	10	10	U
Carbon tetrachloride	4.1	4.1	U
Toluene	4.1	4.1	U

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number			FILL03FB
Laboratory Sample Number			HA1521
Sampling Date			10/12/89
Dilution Factor			1.0
Units	Quant Limit ug/L	Quant Limit ug/Kg	ug/L
APPENDIX IX VOLATILE COMPOUNDS (continued)			
Bromoform	6.0	6.0	U
1,1,1-Trichloroethane	1.6	1.6	U
1,1,2-Trichloroethane	3.8	3.8	U
Trichloroethene	5.0	5.0	U
Trichlorofluoromethane	10	10	U
1,2,3-Trichloropropane	1.9	1.9	U
Vinyl Chloride	10	10	UJ
Acetone	10	10	UJ
Ethylbenzene	7.2	7.2	U
2-Hexanone	10	10	U
Methyl isobutyl ketone	10	10	U
Styrene	10	10	U
Vinyl acetate	10	10	U
m-Xylene	10	10	U
o,p-Xylenes	10	10	U

continued next page (see last page of table for notes)

TABLE 2  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number			G308F1	G308F2	G342F1	G342F2	G344F1	G344F2	SED04FB	SED04TB	S19
Laboratory Sample Number			HA1483	HA1484	HA1498	HA1497	HA1467	HA1488	HA1568	HA1743	HA1558
Sampling Date	Quant	Quant	10/16/89	10/16/89	10/13/89	10/13/89	10/16/89	10/16/89	10/13/89	10/13/89	10/13/89
Dilution Factor	Limit	Limit	1.0	1.0	5.0	1.0	1.0	2.0	1.0	1.0	1.0
Units	ug/L	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/L	ug/L	ug/Kg
PRIORITY POLLUTANT P/T VOLATILE COMPOUNDS											
Acrolein	100	100	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acrylonitrile	100	100	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzene	4.4	4.4	1.5 J	2.2 J	U	10	3.0 J	51.4 J	U	U	U
Bromoform	4.7	4.7	UJ	UJ	U	UJ	UJ	UJ	U	U	U
Carbon Tetrachloride	2.8	2.8	UJ	UJ	U	U	UJ	UJ	U	U	U
Chlorobenzene	6.0	6.0	UJ	UJ	U	U	1.9 J	13.4 J	U	U	UJ
Chlorodibromomethane	3.1	3.1	UJ	UJ	U	U	UJ	UJ	U	U	U
Chloroethane	10	10	U	UJ	U	U	UJ	UJ	U	U	U
2-Chloroethylvinyl ether	10	10	U	UJ	U	U	UJ	UJ	U	U	U
Chloroform	1.6	1.6	U	UJ	U	U	UJ	UJ	U	U	U
Dichlorobromomethane	2.2	2.2	UJ	UJ	U	U	UJ	UJ	U	U	U
Dichlorodifluoromethane	10	10	U	UJ	U	U	UJ	UJ	U	U	U
1,1-Dichloroethane	4.7	4.7	U	UJ	U	U	1.7 J	UJ	U	U	U
1,2-Dichloroethane	2.8	2.8	U	UJ	U	U	UJ	12.2 J	U	U	U
1,1-Dichloroethene	2.8	2.8	U	UJ	U	13.6	UJ	UJ	U	U	U
1,2-Dichloropropane	6.0	6.0	UJ	UJ	U	U	UJ	UJ	U	U	U
cis-1,3-Dichloropropene	5.0	5.0	UJ	UJ	U	U	UJ	UJ	U	U	U
Ethylbenzene	7.2	7.2	UJ	UJ	U	3.2 J	6.2 J	88.5 J	U	U	UJ
Methyl bromide	10	10	U	UJ	U	U	UJ	UJ	U	U	U
Methyl chloride	10	10	U	UJ	U	UJ	UJ	UJ	UJ	U	U
Methylene Chloride	2.8	2.8	19.4 B	21.7 B	922	53.6	21.9 JB	42.2 J	17.4 J	15.8 B	32.1 JB
1,1,2,2-Tetrachloroethane	4.1	4.1	UJ	UJ	U	U	UJ	UJ	U	U	UJ
Tetrachloroethene	4.1	4.1	UJ	UJ	U	U	UJ	UJ	U	U	UJ
Toluene	6.0	6.0	UJ	UJ	U	3.2 J	UJ	217 J	U	U	UJ
1,2-Dichloroethene (trans)	1.6	1.6	U	UJ	U	U	1.2 J	UJ	U	U	U
1,1,1-Trichloroethane	3.8	3.8	UJ	UJ	U	U	UJ	UJ	U	U	U
1,1,2-Trichloroethane	5.0	5.0	UJ	UJ	U	U	UJ	UJ	U	U	U
Trichloroethene	1.9	1.9	UJ	UJ	U	U	2.65 J	3.4 J	U	U	U
Trichlorofluoromethane	10	10	U	UJ	20.8 J	U	2.1 J	UJ	U	U	U
Vinyl Chloride	10	10	U	UJ	UJ	15.3 J	UJ	UJ	U	U	U
trans-1,3-Dichloropropene	10	10	UJ	UJ	U	U	UJ	UJ	U	U	U

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TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number			G308F1	G308F2	G342F1	G342F2	G344F1	G344F2	SED04FB	SED04TB	S19
Laboratory Sample Number			HA1483	HA1484	HA1498	HA1497	HA1467	HA1468	HA1568	HA1743	HA1558
Sampling Date	Quant	Quant	10/16/89	10/18/89	10/13/89	10/13/89	10/16/89	10/16/89	10/13/89	10/13/89	10/13/89
Dilution Factor	Limit	Limit	12.6	14.4	1.11	1.23	12	11.8	1.0	NA	1.5
Units	ug/L	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
PRIORITY POLLUTANT ACID EXTRACTABLE COMPOUNDS											
2-Chlorophenol	3.9	340	R	U	U	1130	U	U	R	NA	U
2,4-Dichlorophenol	3.2	280	R	U	U	903	U	U	R	NA	U
2,4-Dimethylphenol	3.2	280	R	U	U	U	U	U	R	NA	U
4,6-Dinitro-2-methylphenol	29	2400	R	U	U	U	U	U	R	NA	U
2,4-Dinitrophenol	50	4300	R	U	U	U	U	U	R	NA	U
2-Nitrophenol	4.3	370	R	U	U	U	U	U	R	NA	U
4-Nitrophenol	2.9	240	R	U	U	U	U	U	R	NA	U
4-Chloro-3-methylphenol	3.6	310	R	U	U	U	U	U	R	NA	U
Pentachlorophenol	4.3	370	R	U	U	U	U	U	R	NA	U
Phenol	1.8	150	R	U	121 J	56200	U	3620	R	NA	705
2,4,6-Trichlorophenol	3.2	280	R	U	U	U	U	U	R	NA	U

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number Laboratory Sample Number Sampling Date Dilution Factor Units	Quant Limit ug/L	Quant Limit ug/Kg	G308F1 HA1483 10/16/89 12.6 ug/Kg	G308F2 HA1484 10/16/89 14.4 ug/Kg	G342F1 HA1498 10/13/89 1.11 ug/Kg	G342F2 HA1497 10/13/89 1.23 ug/Kg	G344F1 HA1487 10/16/89 12 ug/Kg	G344F2 HA1488 10/16/89 11.8 ug/Kg	SED04FB HA1588 10/13/89 1.0 ug/Kg	SED04TB HA1743 10/13/89 NA ug/Kg	S19 HA1558 10/13/89 1.5 ug/Kg
PRIORITY POLLUTANT BASE/NEUTRAL EXTRACTABLE COMPOUNDS											
Acenaphthene	2.3	220	4820 J	3030	U	345	U	UJ	R	NA	U
Acenaphthylene	4.2	410	R	U	U	U	U	UJ	R	NA	U
Anthracene	2.3	220	10200 J	5880	U	938	U	UJ	R	NA	134 J
Benzo(a)anthracene	9.3	910	27600 J	703 J	367 J	1090 J	U	UJ	R	NA	364 J
Benzo(a)pyrene	3.0	290	22700 J	5200	593	909 J	U	UJ	R	NA	U
Benzo(b)fluoranthene	5.7	560	R	427 J	483 J	596 J	U	UJ	R	NA	U
Benzo(g,h,i)perylene	4.9	480	14100 J	353 J	873	819 J	U	UJ	R	NA	U
Benzo(k)fluoranthene	3.0	290	42900 J	U	396	529 J	U	UJ	R	NA	U
bis(2-Chloroethoxy)methane	6.3	620	R	U	U	U	U	UJ	R	NA	U
Bis(2-chloroethyl) ether	6.8	660	R	U	U	U	U	UJ	R	NA	U
bis(2-chloroisopropyl) ether	6.8	660	R	U	U	U	UJ	UJ	R	NA	U
bis(2-Ethylhexyl)phthalate	12	1200	R	U	488 J	UJ	U	138 J	13.7 J	NA	1481 J
4-Bromophenylphenyl ether	2.3	220	R	U	U	U	U	UJ	R	NA	U
Butylbenzylphthalate	12	1200	R	U	UJ	UJ	U	UJ	R	NA	UJ
2-Chloronaphthalene	2.3	220	R	U	U	U	U	UJ	R	NA	U
4-Chlorophenylphenyl ether	5.0	490	R	U	U	U	U	UJ	R	NA	U
Chrysene	3.0	290	28700 J	7470	553	972	U	UJ	R	NA	502
Dibenz(a,h)anthracene	3.0	290	R	U	U	UJ	U	UJ	R	NA	U
1,2-Dichlorobenzene	2.3	220	R	U	U	U	U	UJ	R	NA	U
1,3-Dichlorobenzene	2.3	220	R	U	U	U	U	UJ	R	NA	U
1,4-Dichlorobenzene	5.2	510	R	U	U	U	U	UJ	R	NA	U
3,3'-Dichlorobenzidine	19.6	1920	R	UJ	U	U	U	UJ	R	NA	U
Diethylphthalate	12	1200	R	U	U	U	U	UJ	R	NA	231 J
Dimethylphthalate	12	1200	R	U	U	U	U	UJ	R	NA	U
Di-n-butylphthalate	12	1200	R	U	U	U	U	UJ	0.77 J	NA	152 J
2,4-Dinitrotoluene	6.8	660	R	U	U	U	U	UJ	R	NA	U
2,6-Dinitrotoluene	2.3	220	R	U	U	U	U	UJ	R	NA	U
Di-n-octylphthalate	12	1200	R	U	U	UJ	U	UJ	R	NA	U
Fluoranthene	2.6	260	72100 J	30200	646	2680	221 J	UJ	R	NA	799
Fluorene	2.3	220	5230 J	3620	U	822	U	UJ	R	NA	U
Hexachlorobenzene	2.3	220	R	U	1080	U	U	UJ	R	NA	U
Hexachlorobutadiene	1.1	100	R	U	U	U	U	UJ	R	NA	U
Hexachlorocyclopentadiene	12	1200	R	UJ	UJ	UJ	U	UJ	R	NA	UJ
Hexachloroethane	1.9	190	R	U	U	U	U	UJ	R	NA	U
Indeno(1,2,3-cd)pyrene	4.4	430	508 J	U	288 J	306 J	U	UJ	R	NA	UJ
Isophorone	2.6	260	R	U	U	U	U	UJ	R	NA	U
Naphthalene	1.9	190	2650 J	4420	U	1400	U	4840 J	R	NA	126 J
Nitrobenzene	2.3	220	R	U	U	U	U	UJ	R	NA	U
N-Nitroso-dimethylamine	12	1200	R	U	U	U	U	UJ	R	NA	U
N-Nitroso-di-n-propylamine	12	1200	R	U	U	U	UJ	UJ	R	NA	U
N-Nitroso-diphenylamine	2.3	220	R	U	U	U	U	UJ	R	NA	U
Phenanthrene	6.4	630	51200 J	26700	519 J	4310	U	UJ	R	NA	527 J
Pyrene	2.3	220	54700 J	23600	632	1950	191 J	UJ	R	NA	760
1,2,4-Trichlorobenzene	2.3	220	R	U	U	U	U	UJ	R	NA	U

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number Laboratory Sample Number Sampling Date Dilution Factor Units	Quant Limit ug/L	Quant Limit ug/Kg	G308F1 HA1483 10/16/89 38 ug/Kg	G308F2 HA1484 10/16/89 43 ug/Kg	G342F1 HA1498 10/13/89 3.7 ug/Kg	G342F2 HA1497 10/13/89 3.8 ug/Kg	G344F1 HA1467 10/16/89 36 ug/Kg	G344F2 HA1468 10/16/89 36 ug/Kg	SED04FB HA1568 10/13/89 1.0 ug/L	SED04TB HA1743 10/13/89 NA ug/L	S19 HA1558 10/13/89 4.2 ug/Kg
PESTICIDES											
Aldrin	0.05	1.7	U	U	U	U	U	U	U	NA	U
Alpha-BHC	0.05	1.7	U	U	U	U	624	U	U	NA	U
Beta-BHC	0.05	1.7	U	U	U	U	U	U	U	NA	U
Gamma-BHC (Lindane)	0.05	1.7	U	U	U	U	U	U	U	NA	U
Delta-BHC	0.05	1.7	U	U	U	U	U	U	U	NA	U
Chlordane	1.0	33	U	U	U	U	U	U	U	NA	U
4,4'-DDT	0.10	3.3	U	U	U	U	241	U	U	NA	U
4,4'-DDE	0.10	3.3	U	U	U	U	U	U	U	NA	U
4,4'-DDD	2.5	83	U	U	U	U	U	U	U	NA	U
Dieldrin	0.10	3.3	U	U	50.1	U	304	U	U	NA	U
Endosulfan I	0.05	1.7	U	U	U	U	U	U	U	NA	U
Endosulfan II	0.10	3.3	U	U	U	U	U	U	U	NA	U
Endosulfan Sulfate	0.10	3.3	U	U	U	U	4040	U	U	NA	U
Endrin	0.10	3.3	U	U	203	U	1160	U	U	NA	U
Endrin Aldehyde	0.10	3.3	U	U	70.2	U	U	U	U	NA	U
Heptachlor	0.05	1.7	U	U	15.1	U	U	U	U	NA	U
Heptachlor Epoxide	0.05	1.7	U	U	U	U	U	U	U	NA	U
Toxaphene	2.0	65	U	U	U	U	U	U	U	NA	U
Arochlor-1016	0.55	18	U	U	U	U	U	U	U	NA	U
Arochlor-1221	0.55	18	U	U	U	U	U	U	U	NA	U
Arochlor-1232	0.55	18	U	U	U	U	U	U	U	NA	U
Arochlor-1242	0.55	18	U	U	U	U	U	U	U	NA	U
Arochlor-1248	0.55	18	U	U	U	U	U	U	U	NA	U
Arochlor-1254	1.0	33	U	U	U	U	U	U	U	NA	U
Arochlor-1260	1.0	33	U	U	U	U	U	U	U	NA	U

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number Laboratory Sample Number Sampling Date Units	Quant Limit ug/L	Quant Limit ug/Kg	G308F1 HA1483 10/16/89 ug/Kg	G308F2 HA1484 10/16/89 ug/Kg	G342F1 HA1498 10/13/89 ug/Kg	G342F2 HA1497 10/13/89 ug/Kg	G344F1 HA1467 10/16/89 ug/Kg	G344F2 HA1468 10/16/89 ug/Kg	SED04FB HA1568 10/13/89 ug/L	SED04TB HA1743 10/13/89 ug/L	S19 HA1558 10/13/89 ug/Kg
PRIORITY POLLUTANT INORGANIC PARAMETERS (METALS)											
Antimony	60	6000	U	U	NA	33000	U	U	U	NA	U
Arsenic	10	1000	9100	9700	NA	30000	15000	21000	U	NA	23000
Beryllium	1.0	100	650	850	NA	2200	2200	2200	U	NA	450
Cadmium	2.0	200	3000	4600	NA	1300	6100	5800	U	NA	3600
Chromium	10	1000	14000	20000	NA	55000	38000	39000	U	NA	14000
Copper	10	1000	63000	49000	NA	46000	50000	31000	U	NA	26000
Lead	5.0	500	130000	100000	NA	52000	130000	68000	U	NA	46000
Mercury	0.20	80	250	140	NA	120	160	BMDL J	U	NA	BMDL J
Nickel	20	1000	34000	29000	NA	28000	19000	20000	U	NA	18000
Selenium	5.0	500	UJ	BMDL JB	NA	4800	BMDL JB	3300	U	NA	BMDL JB
Silver	10	1000	2000	1700	NA	U	2700	1600	U	NA	BMDL J
Thallium	10	1000	130000	BMDL JB	NA	2300	1700	1800	U	NA	BMDL J
Zinc	20	2000	U	110000	NA	329000	239000	190000	27	NA	160000
CONVENTIONAL PARAMETERS			mg/L	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/L	mg/L	mg/Kg
Ammonia as N	0.10	3.0	NA	NA	NA	NA	NA	NA	U	NA	52.8
Chemical Oxygen Demand(COD)	50	50	NA	NA	NA	NA	NA	NA	U	NA	48200
Chloride	1.0	1.0	NA	NA	NA	NA	NA	NA	U	NA	52.6
Sulfate as SO4	5.0	5.0	NA	NA	NA	NA	NA	NA	U	NA	U
Nitrate + Nitrite	0.05	0.05	NA	NA	NA	NA	NA	NA	U	NA	1.5
pH (s.u.)	—	—	NA	NA	NA	NA	NA	NA	8.48/8.5	NA	8.29/8/31
Cyanide, total	0.01	0.5	U	U	U	U	U	U	U	NA	U
Phenols, total	0.10	3.0	U	U	U	72.8	U	5.8	U	NA	U

LEGEND:

- U Compound was not detected at laboratory method detection limit.
  - J Estimated value due to limitations identified during the quality assurance review.
  - UJ Reported method detection limit is estimated due to limitations identified during the quality assurance review.
  - B Compound was detected in a laboratory and/or field blank at similar concentrations. May represent laboratory and/or field contamination.
  - R Unreliable result. Compound may or may not be present.
  - \* Sample analyzed at multiple dilutions. Summary table is a hybrid of diluted and undiluted results.
  - No standard available. Compound was qualitatively searched for.
  - NA Not analyzed
  - NP Not provided
  - IND Indeterminate. Standard and/or spikes could not be detected at method detection limit.
  - BMDL Below Method Detection Limit reported by laboratory.
- Discrepancies may exist between the laboratory data tables and the data validation summary tables due to variations in the rounding of calculations.

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number			S20	S21	S21DUP	S22	S23	S24	S25	S28	S29
Laboratory Sample Number			HA1559	HA1548	HA1547	HA1556	HA1557	HA1564	HA1565	HA1548	HA1549
Sampling Date	Quant	Quant	10/13/89	10/13/89	10/13/89	10/13/89	10/13/89	10/13/89	10/13/89	10/13/89	10/13/89
Dilution Factor	Limit	Limit	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Units	ug/L	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
PRIORITY POLLUTANT P/T VOLATILE COMPOUNDS											
Acrolein	100	100	NA	NA	NA	NA	NA	NA	U	NA	NA
Acrylonitrile	100	100	NA	NA	NA	NA	NA	NA	U	NA	NA
Benzene	4.4	4.4	U	U	U	UJ	UJ	UJ	UJ	U	UJ
Bromoform	4.7	4.7	U	U	U	UJ	UJ	UJ	UJ	U	UJ
Carbon Tetrachloride	2.8	2.8	U	U	U	UJ	UJ	UJ	UJ	U	UJ
Chlorobenzene	6.0	6.0	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Chlorodibromomethane	3.1	3.1	U	U	U	UJ	UJ	UJ	UJ	U	UJ
Chloroethane	10	10	U	U	U	U	U	UJ	U	U	UJ
2-Chloroethylvinyl ether	10	10	U	U	U	U	U	UJ	U	U	UJ
Chloroform	1.6	1.6	U	U	U	U	U	UJ	U	U	UJ
Dichlorobromomethane	2.2	2.2	U	U	U	UJ	UJ	UJ	UJ	U	UJ
Dichlorodifluoromethane	10	10	U	U	U	U	U	UJ	U	U	UJ
1,1-Dichloroethane	4.7	4.7	U	U	U	2 J	U	UJ	U	U	UJ
1,2-Dichloroethane	2.8	2.8	U	U	U	U	U	UJ	U	U	UJ
1,1-Dichloroethene	2.8	2.8	U	U	U	U	U	UJ	U	U	UJ
1,2-Dichloropropane	6.0	6.0	U	U	U	UJ	UJ	UJ	UJ	U	UJ
cis-1,3-Dichloropropene	5.0	5.0	U	U	U	UJ	UJ	UJ	UJ	U	UJ
Ethylbenzene	7.2	7.2	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Methyl bromide	10	10	U	U	U	U	U	UJ	U	U	UJ
Methyl chloride	10	10	U	U	U	U	U	UJ	U	U	UJ
Methylene Chloride	2.8	2.8	36.5	21 B	18.3 JB	32.8 B	31.4 JB	51.4 JB	453 J	57.4 B	19.3 JB
1,1,2,2-Tetrachloroethane	4.1	4.1	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Tetrachloroethene	4.1	4.1	UJ	UJ	UJ	12.8 J	UJ	UJ	UJ	UJ	UJ
Toluene	6.0	6.0	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
1,2-Dichloroethene (trans)	1.6	1.6	U	2.98	U	2.25	UJ	UJ	U	U	UJ
1,1,1-Trichloroethane	3.8	3.8	U	U	U	UJ	UJ	UJ	UJ	U	UJ
1,1,2-Trichloroethane	5.0	5.0	U	U	U	UJ	UJ	UJ	UJ	U	UJ
Trichloroethene	1.9	1.9	U	U	U	6.48 J	UJ	UJ	UJ	U	UJ
Trichlorofluoromethane	10	10	U	U	U	U	U	UJ	U	U	UJ
Vinyl Chloride	10	10	UJ	U	U	UJ	U	UJ	UJ	UJ	UJ
trans-1,3-Dichloropropene	10	10	U	U	U	UJ	UJ	UJ	UJ	U	UJ

continued next page (see last page of table for notes)



TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number			S20	S21	S21DUP	S22	S23	S24	S25	S28	S29
Laboratory Sample Number			HA1559	HA1546	HA1547	HA1556	HA1557	HA1564	HA1565	HA1548	HA1549
Sampling Date	Quant	Quant	10/13/89	10/13/89	10/13/89	10/13/89	10/13/89	10/13/89	10/13/89	10/13/89	10/13/89
Dilution Factor	Limit	Limit	1.6	1.3	1.4	1.1	1.4	1.4	17.6	1.7	2.2
Units	ug/L	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
PRIORITY POLLUTANT ACID EXTRACTABLE COMPOUNDS											
2-Chlorophenol	3.9	340	U	U	U	U	U	U	R	U	U
2,4-Dichlorophenol	3.2	280	U	U	U	U	U	U	R	U	U
2,4-Dimethylphenol	3.2	280	U	U	U	U	U	U	R	U	U
4,6-Dinitro-2-methylphenol	29	2400	UJ	U	U	U	U	UJ	R	U	U
2,4-Dinitrophenol	50	4300	U	U	U	U	U	U	R	U	U
2-Nitrophenol	4.3	370	U	U	U	U	U	U	R	U	U
4-Nitrophenol	2.9	240	U	U	U	U	U	U	R	U	U
4-Chloro-3-methylphenol	3.6	310	U	U	U	U	U	U	R	U	U
Pentachlorophenol	4.3	370	R	U	U	U	U	UJ	R	U	U
Phenol	1.8	150	U	923	832	560	820	U	R	U	1160
2,4,6-Trichlorophenol	3.2	280	U	U	U	U	U	U	R	U	U

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number	Quant	Quant	S20	S21	S21DUP	S22	S23	S24	S25	S28	S29
Laboratory Sample Number	Limit	Limit	HA1559	HA1548	HA1547	HA1556	HA1557	HA1564	HA1565	HA1548	HA1549
Sampling Date	ug/L	ug/Kg	10/13/89	10/13/89	10/13/89	10/13/89	10/13/89	10/13/89	10/13/89	10/13/89	10/13/89
Dilution Factor			1.6	1.3	1.4	1.1	1.4	1.4	17.6	1.7	2.2
Units	ug/L	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
PRIORITY POLLUTANT BASE/NEUTRAL EXTRACTABLE COMPOUNDS											
Acenaphthene	2.3	220	U	216 J	U	U	U	316	R	U	U
Acenaphthylene	4.2	410	U	U	U	U	U	U	R	U	U
Anthracene	2.3	220	155 J	440	133 J	U	U	872 J	R	239 J	395 J
Benzo(a)anthracene	9.3	910	303 J	631 J	U	U	U	1230	R	777 J	1259 J
Benzo(a)pyrene	3.0	290	UJ	608	U	U	U	806	R	658	1100
Benzo(b)fluoranthene	5.7	560	377 J	U	U	U	U	571 J	R	552 J	966 J
Benzo(g,h,i)perylene	4.9	480	UJ	U	U	U	U	U	R	U	U
Benzo(k)fluoranthene	3.0	290	UJ	U	U	U	U	611	R	U	987
bis(2-Chloroethoxy)methane	6.3	620	U	U	U	U	U	U	R	U	U
Bis(2-chloroethyl) ether	6.8	660	U	U	U	U	U	U	R	U	U
bis(2-chloroisopropyl) ether	6.8	660	UJ	U	U	U	U	U	R	U	U
bis(2-Ethylhexyl)phthalate	12	1200	231 J	408 J	649 J	296 J	4530 J	320 J	1084 JB	1306 J	1350 J
4-Bromophenylphenyl ether	2.3	220	UJ	U	U	U	U	U	R	U	U
Butylbenzylphthalate	12	1200	UJ	UJ	UJ	UJ	UJ	U	R	UJ	UJ
2-Chloronaphthalene	2.3	220	U	U	U	U	U	U	R	U	U
4-Chlorophenylphenyl ether	5.0	490	U	U	U	U	U	U	R	U	U
Chrysene	3.0	290	402 J	627	151 J	U	346 J	1370	R	964	1850
Dibenz(a,h)anthracene	3.0	290	UJ	U	U	U	U	U	R	U	U
1,2-Dichlorobenzene	2.3	220	U	U	U	U	U	U	R	U	U
1,3-Dichlorobenzene	2.3	220	U	U	U	U	U	U	R	U	U
1,4-Dichlorobenzene	5.2	510	U	U	U	U	U	U	R	U	U
3,3'-Dichlorobenzidine	19.6	1920	UJ	U	U	U	U	UJ	R	U	U
Diethylphthalate	12	1200	U	U	U	114 J	313 J	U	R	227 J	339 J
Dimethylphthalate	12	1200	U	U	U	U	U	U	R	U	U
Di-n-butylphthalate	12	1200	176 J	U	U	U	121 J	UJ	R	U	223 J
2,4-Dinitrotoluene	6.8	660	U	U	U	U	U	U	R	U	U
2,6-Dinitrotoluene	2.3	220	U	U	U	U	U	U	R	U	U
Di-n-octylphthalate	12	1200	UJ	U	672 J	U	U	U	R	U	U
Fluoranthene	2.6	260	785 J	1570	629	U	621	3720 J	R	1660	2430
Fluorene	2.3	220	U	255 J	128 J	U	U	742	R	191 J	U
Hexachlorobenzene	2.3	220	UJ	U	U	U	U	UJ	R	U	243 J
Hexachlorobutadiene	1.1	100	U	U	U	U	U	U	R	U	U
Hexachlorocyclopentadiene	12	1200	U	UJ	UJ	UJ	UJ	UJ	R	UJ	UJ
Hexachloroethane	1.9	190	U	U	U	U	U	U	R	U	U
Indeno(1,2,3-cd)pyrene	4.4	430	UJ	UJ	UJ	UJ	UJ	U	R	UJ	UJ
Isophorone	2.6	260	U	U	U	U	U	U	R	U	U
Naphthalene	1.9	190	U	123	U	U	U	2010	R	165 J	205 J
Nitrobenzene	2.3	220	U	U	U	U	U	U	R	U	U
N-Nitroso-dimethylamine	12	1200	U	U	U	U	U	U	R	U	U
N-Nitroso-di-n-propylamine	12	1200	UJ	U	U	U	U	U	R	U	U
N-Nitroso-diphenylamine	2.3	220	UJ	U	U	U	U	UJ	R	U	U
Phenanthrene	6.4	630	514 J	1410	460 J	179 J	382 J	3120 J	R	5370 J	1330
Pyrene	2.3	220	681 J	1290	608	U	556	3450	R	1450	2220
1,2,4-Trichlorobenzene	2.3	220	U	U	U	U	U	U	R	U	U

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number			S20	S21	S21DUP	S22	S23	S24	S25	S28	S29
Laboratory Sample Number			HA1559	HA1548	HA1547	HA1556	HA1557	HA1564	HA1565	HA1548	HA1549
Sampling Date	Quant	Quant	10/13/89	10/13/89	10/13/89	10/13/89	10/13/89	10/13/89	10/13/89	10/13/89	10/13/89
Dilution Factor	Limit	Limit	48	4	3.8	3.5	3.7	43	51	4.7	6.5
Units	ug/L	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
PESTICIDES											
Aldrin	0.05	1.7	U	U	U	U	U	U	U	U	U
Alpha-BHC	0.05	1.7	U	U	U	U	U	U	U	U	U
Beta-BHC	0.05	1.7	U	U	U	U	U	U	U	U	U
Gamma-BHC (Lindane)	0.05	1.7	U	U	U	U	U	U	U	U	U
Delta-BHC	0.05	1.7	U	U	U	U	U	U	U	U	U
Chlordane	1.0	33	U	U	U	U	U	U	U	U	U
4,4'-DDT	0.10	3.3	U	U	U	U	U	U	U	U	U
4,4'-DDE	0.10	3.3	U	U	U	U	U	U	U	U	U
4,4'-DDD	2.5	83	U	U	U	U	U	U	U	U	U
Dieldrin	0.10	3.3	U	U	U	U	U	U	U	U	U
Endosulfan I	0.05	1.7	U	U	U	U	U	U	U	U	U
Endosulfan II	0.10	3.3	U	U	U	U	U	U	U	U	U
Endosulfan Sulfate	0.10	3.3	U	U	U	U	U	U	U	U	U
Endrin	0.10	3.3	U	U	U	U	U	U	U	U	U
Endrin Aldehyde	0.10	3.3	U	U	U	U	U	U	U	U	U
Heptachlor	0.05	1.7	U	14.6 J	U J	U	U	U	U	U	71.7
Heptachlor Epoxide	0.05	1.7	U	U	U	U	U	U	U	U	U
Toxaphene	2.0	65	U	U	U	U	U	U	U	U	U
Arochlor-1016	0.55	18	U	U	U	U	U	U	U	U	U
Arochlor-1221	0.55	18	U	U	U	U	U	U	U	U	U
Arochlor-1232	0.55	18	U	U	U	U	U	U	U	U	U
Arochlor-1242	0.55	18	U	U	U	U	U	U	U	U	U
Arochlor-1248	0.55	18	U	U	U	U	U	U	U	U	U
Arochlor-1254	1.0	33	U	U	U	U	U	U	U	U	U
Arochlor-1260	1.0	33	U	U	U	U	U	U	U	U	U

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number Laboratory Sample Number Sampling Date Units	Quant Limit ug/L	Quant Limit ug/Kg	S20 HA1559 10/13/89 ug/Kg	S21 HA1546 10/13/89 ug/Kg	S21DUP HA1547 10/13/89 ug/Kg	S22 HA1556 10/13/89 ug/Kg	S23 HA1557 10/13/89 ug/Kg	S24 HA1564 10/13/89 ug/Kg	S25 HA1525 10/18/89 ug/Kg	S28 HA1548 10/13/89 ug/Kg	S29 HA1549 10/13/89 ug/Kg
<b>INORGANIC PARAMETERS (METALS)</b>											
Antimony	60	6000	U	11000	10000	15000	U	NP	U	15000	30000
Arsenic	10	1000	28000	24000	21000	35000	28000	NP	21000	17000	26700
Beryllium	1.0	100	460	210	250	210	440	NP	570	510	730
Cadmium	2.0	200	4000	BMDL J	BMDL J	U	4000	NP	4200	800	890
Calcium	200	20000	NA	25900000	28000000	82100000	NA	NA	NA	59700000	66600000
Chromium	10	10	12000	9100	9800	6900	13000	NP	20000	33000	54000
Copper	10	10	23000	22000	21000	21000	31000	NP	37000	46000	65000
Lead	5.0	5.0	42000	29000	32000	22000	50000	NP	77000	110000	150000
Magnesium	100	10000	NA	13700000	14300000	43700000	NA	NA	NA	28600000	25600000
Mercury	0.20	80	BMDL J	BMDL J	BMDL J	U	110	NP	140	130	200
Nickel	20	1000	16000	14000	17000	17000	19000	NP	20000	34000	40000
Potassium	500	50000	NA	700000	780000	690000	NA	NA	NA	1400000	1800000
Selenium	5.0	500	BMDL JB	BMDL J	BMDL J	U	BMDL JB	NP	BMDL JB	BMDL J	BMDL J
Silver	10	1000	1600	U	U	BMDL J	BMDL J	NP	BMDL JB	BMDL J	BMDL J
Sodium	500	50000	NA	BMDL J	BMDL J	BMDL J	NA	NA	NA	110000	150000
Thallium	10	1000	BMDL J	U	BMDL J	BMDL J	BMDL J	NP	BMDL JB	U	BMDL J
Zinc	20	2000	250000	170000	170000	55000	240000	NP	240000	373000	380000
<b>CONVENTIONAL PARAMETERS</b>											
	mg/L	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg
Ammonia as N	0.10	3.0	46.7	31.3	29.5	8.8	23.4	26.7	NA	83.3	81
Chemical Oxygen Demand(COD)	50	50	38500	45500	44100	30700	36500	53000	NA	73000	94500
Chloride	1.0	1.0	26.4	19.3	38.6	10.3	37.9	23.6	NA	31.8	80.4
Sulfate as SO4	5.0	5.0	U	U	U	U	U	U	NA	U	178
Nitrate + Nitrite	0.05	0.05	2.1	1.9	1.3	U	1.6	4.7	NA	0.998748	U
pH (s.u.)	-	-	8.23/8.25	8.58/8.61	7.92/8.01	8.40/8.47	8.24/8.24	8.35/8.41	8.32/8.33	U	7.69/7.71
Cyanide, total	0.01	0.5	U	U	U	U	U	U	U	U	U
Phenols, total	0.10	3.0	U	U	U	U	U	U	U	U	U

**LEGEND:**

- U Compound was not detected at laboratory method detection limit.
- J Estimated value due to limitations identified during the quality assurance review.
- UJ Reported method detection limit is estimated due to limitations identified during the quality assurance review.
- B Compound was detected in a laboratory and/or field blank at similar concentrations. May represent laboratory and/or field contamination.
- R Unreliable result. Compound may or may not be present.
- \* Sample analyzed at multiple dilutions. Summary table is a hybrid of diluted and undiluted results.
- No standard available. Compound was qualitatively searched for.
- NA Not analyzed
- NP Not provided
- IND Indeterminate. Standard and/or spikes could not be detected at method detection limit.
- BMDL Below Method Detection Limit reported by laboratory.

Discrepancies may exist between the laboratory data tables and the data validation summary tables due to variations in the rounding of calculations.

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number			B301F1	B301F1DUP	B301F2	B301F2DUP	G302F2	G303F1	G303F2	SED01FB	SED01TB	SED02FB
Laboratory Sample Number			HA1491	HA1492	HA1466	HA1464	HA1500	HA1473	HA1474	HA1573	HA1740	HA1571
Sampling Date			10/12/89	10/12/89	10/12/89	10/12/89	10/12/89	10/10/89	10/11/89	10/11/89	10/11/89	10/12/89
Dilution Factor	Quant Limit	Quant Limit	10	1.0	1.0/5.0	1.0/5.0	5.0	1.0	1.0	1.0	1.0	1.0
Units	ug/L	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/L	ug/L	ug/L
PRIORITY POLLUTANT P/T VOLATILE COMPOUNDS												
Acrolein	100	100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acrylonitrile	100	100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzene	4.4	4.4	27.4 J	15.2	7.19 J	U	U	U	2.5 JB	U	U	U
Bromoform	4.7	4.7	U	U	U	U	U	U	U	U	U	U
Carbon Tetrachloride	2.8	2.8	U	U	U	U	U	U	U	U	U	U
Chlorobenzene	6.0	6.0	61.5	22.7	U	U	U	U	U	U	U	U
Chlorodibromomethane	3.1	3.1	U	U	U	U	U	U	U	U	U	U
Chloroethane	10	10	U	U	U	U	U	R	U	U	U	U
2-Chloroethylvinyl ether	10	10	U	U	U	U	U	U	U	U	U	U
Chloroform	1.6	1.6	U	U	U	U	U	U	U	U	U	U
Dichlorobromomethane	2.2	2.2	U	U	U	U	U	U	U	U	U	U
Dichlorodifluoromethane	10	10	U	U	U	U	U	U	U	U	U	U
1,1-Dichloroethane	4.7	4.7	U	4 J	U	U	U	U	U	U	U	U
1,2-Dichloroethane	2.8	2.8	U	U	U	U	U	U	U	U	U	U
1,1-Dichloroethene	2.8	2.8	U	3.34	U	U	U	U	U	U	U	U
1,2-Dichloropropane	6.0	6.0	U	U	U	U	U	U	U	U	U	U
cis-1,3-Dichloropropene	5.0	5.0	U	U	U	U	U	U	U	U	U	U
Ethylbenzene	7.2	7.2	U	4 J	U	U	U	1.7 J	U	U	U	U
Methyl bromide	10	10	U	U	U	U	U	U	U	U	U	U
Methyl chloride	10	10	U	U	U	U	U	U	U	U	U	U
Methylene Chloride	2.8	2.8	734 B	40.8 B	948 J	218 JB	2470	37 B	45.5 B	15.1 J	U	13.9 JB
1,1,2,2-Tetrachloroethane	4.1	4.1	U	U	U	U	U	U	U	U	U	U
Tetrachloroethene	4.1	4.1	U	U	U	U	U	U	U	U	U	U
Toluene	6.0	6.0	53 J	20.6	4 J	U	U	2.0 JB	1.2 J	U	U	U
1,2-Dichloroethene (trans)	1.6	1.6	U	U	U	U	U	U	U	U	U	U
1,1,1-Trichloroethane	3.8	3.8	U	U	U	U	U	1.3 J	U	U	U	U
1,1,2-Trichloroethane	5.0	5.0	U	U	U	U	U	U	U	U	U	U
Trichloroethene	1.9	1.9	U	1 J	U	U	U	U	U	U	U	U
Trichlorofluoromethane	10	10	U	2 J	U	U	U	1.5 J	U	U	U	U
Vinyl Chloride	10	10	U	2 J	U	U	U	U	U	U	U	U
trans-1,3-Dichloropropene	10	10	U	U	U	U	U	U	U	U	U	U

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number			B301F1	B301F1DUP	B301F2	B301F2DUP	G302F2	G303F1	G303F2	SED01FB	SED01TB	SED02FB
Laboratory Sample Number			HA1491	HA1492	HA1466	HA1464	HA1500	HA1473	HA1474	HA1573	HA1740	HA1571
Sampling Date	Quant	Quant	10/12/89	10/12/89	10/12/89	10/12/89	10/12/89	10/10/89	10/11/89	10/11/89	10/11/89	10/12/89
Dilution Factor	Limit	Limit	13	11	1.2	1.2	2.4	11.5	1.1	1	NA	1
Units	ug/L	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/L	ug/L	ug/L
PRIORITY POLLUTANT ACID EXTRACTABLE COMPOUNDS												
2-Chlorophenol	3.9	340	U	U	U	U	U	U	U	R	NA	R
2,4-Dichlorophenol	3.2	280	U	U	U	U	U	U	U	R	NA	R
2,4-Dimethylphenol	3.2	280	U	U	U	U	U	U	U	R	NA	R
4,6-Dinitro-2-methylphenol	29	2400	U	U	U	U	U	U	U	R	NA	R
2,4-Dinitrophenol	50	4300	U	U	U	U	U	U	U	R	NA	R
2-Nitrophenol	4.3	370	U	U	U	U	U	U	U	R	NA	R
4-Nitrophenol	2.9	240	U	U	U	U	U	U	U	R	NA	R
4-Chloro-3-methylphenol	3.6	310	U	U	U	U	U	U	U	R	NA	R
Pentachlorophenol	4.3	370	U	U	U	U	U	U	U	R	NA	R
Phenol	1.8	150	U	U	U	U	825	U	U	R	NA	R
2,4,6-Trichlorophenol	3.2	280	U	U	U	U	U	U	U	R	NA	R

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number Laboratory Sample Number Sampling Date Dilution Factor Units	Quant Limit ug/L	Quant Limit ug/Kg	B301F1 HA1491 10/12/89 13 ug/Kg	B301F1DUP HA1492 10/12/89 11 ug/Kg	B301F2 HA1468 10/12/89 1.2 ug/Kg	B301F2DUP HA1464 10/12/89 1.2 ug/Kg	G302F2 HA1500 10/12/89 2.4 ug/Kg	G303F1 HA1473 10/10/89 11.5 ug/Kg	G303F2 HA1474 10/11/89 1.1 ug/Kg	SED01FB HA1573 10/11/89 1 ug/L	SED01TB HA1740 10/11/89 NA ug/L	SED02FB HA1571 10/12/89 1 ug/L
PRIORITY POLLUTANT BASE/NEUTRAL EXTRACTABLE COMPOUNDS												
Acenaphthene	2.3	220	U	U	U	U	U	308 J	U	R	NA	R
Acenaphthylene	4.2	410	U	U	U	U	U	U	U	R	NA	R
Anthracene	2.3	220	U	U	136 J	U	U	7100	U	R	NA	R
Benzo(a)anthracene	9.3	910	1775 J	U	307 J	205 J	U	18300	266 J	R	NA	R
Benzo(a)pyrene	3.0	290	1828 J	1346 J	224 J	223 J	UJ	14400	228 J	R	NA	R
Benzo(b)fluoranthene	5.7	560	2093 J	1653 J	215 J	233 J	UJ	18600	180 J	R	NA	R
Benzo(g,h,i)perylene	4.9	480	U	U	UJ	U	UJ	9640	U	R	NA	R
Benzo(k)fluoranthene	3.0	290	U	U	212 J	129 J	UJ	8840	150 J	R	NA	R
bis(2-Chloroethoxy)methane	6.3	620	U	U	U	U	U	U	U	R	NA	R
Bis(2-chloroethyl) ether	6.8	660	U	U	U	U	U	U	U	R	NA	R
bis(2-chloroisopropyl) ether	6.8	660	U	U	U	U	UJ	U	U	R	NA	R
bis(2-Ethylhexyl)phthalate	12	1200	U	U	11100	993 JB	444 J	U	U	16.4 JB	NA	18.7 JB
4-Bromophenylphenyl ether	2.3	220	U	U	U	U	U	U	U	R	NA	R
Butylbenzylphthalate	12	1200	U	U	U	U	UJ	U	U	R	NA	R
2-Chloronaphthalene	2.3	220	U	U	U	U	U	U	U	R	NA	R
4-Chlorophenylphenyl ether	5.0	490	U	U	U	U	U	U	U	R	NA	R
Chrysene	3.0	290	1695 J	1254 J	318	221 J	U	16800	243 J	R	NA	R
Dibenz(a,h)anthracene	3.0	290	U	U	UJ	U	UJ	961 J	U	R	NA	R
1,2-Dichlorobenzene	2.3	220	U	U	U	U	U	U	U	R	NA	R
1,3-Dichlorobenzene	2.3	220	U	U	U	U	U	U	U	R	NA	R
1,4-Dichlorobenzene	5.2	510	U	U	U	U	U	U	U	R	NA	R
3,3'-Dichlorobenzidine	19.6	1920	U	U	U	U	U	U	U	R	NA	R
Diethylphthalate	12	1200	U	U	U	U	U	U	U	R	NA	R
Dimethylphthalate	12	1200	U	U	U	U	U	U	U	R	NA	R
Di-n-butylphthalate	12	1200	U	U	982 J	U	UJ	U	U	0.66 JB	NA	1.0 JB
2,4-Dinitrotoluene	6.8	660	U	U	U	U	U	U	U	R	NA	R
2,6-Dinitrotoluene	2.3	220	U	U	U	U	U	U	U	R	NA	R
Di-n-octylphthalate	12	1200	U	U	UJ	U	UJ	U	U	R	NA	R
Fluoranthene	2.6	260	4150	2630	577	402	97 J	32900	442	R	NA	R
Fluorene	2.3	220	U	U	130 J	U	U	U	U	R	NA	R
Hexachlorobenzene	2.3	220	U	U	U	U	U	U	U	R	NA	R
Hexachlorobutadiene	1.1	100	U	U	U	U	U	U	U	R	NA	R
Hexachlorocyclopentadiene	12	1200	U	U	U	UJ	UJ	U	U	R	NA	R
Hexachloroethane	1.9	190	U	U	U	U	U	U	U	R	NA	R
Indeno(1,2,3-cd)pyrene	4.4	430	U	U	U	U	UJ	1536 J	U	R	NA	R
Isophorone	2.6	260	U	U	U	U	U	U	U	R	NA	R
Naphthalene	1.9	190	U	U	159 J	158 J	U	U	U	R	NA	R
Nitrobenzene	2.3	220	U	U	U	U	UJ	U	U	R	NA	R
N-Nitroso-dimethylamine	12	1200	U	U	U	U	U	U	U	R	NA	R
N-Nitroso-di-n-propylamine	12	1200	U	U	U	U	UJ	U	U	R	NA	R
N-Nitroso-diphenylamine	2.3	220	U	U	U	U	U	U	U	R	NA	R
Phenanthrene	6.4	630	4119 J	2885 J	607 J	443 J	193 J	21600	430 J	R	NA	R
Pyrene	2.3	220	3280	2007 J	416	301	U	24500	362	R	NA	R
1,2,4-Trichlorobenzene	2.3	220	U	U	U	U	U	U	U	R	NA	R

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number Laboratory Sample Number Sampling Date Dilution Factor Units	Quant Limit ug/L	Quant Limit ug/Kg	B301F1 HA1491 10/12/89 3.5 ug/Kg	B301F1DUP HA1492 10/12/89 3.6 ug/Kg	B301F2 HA1466 10/12/89 3.6 ug/Kg	B301F2DUP HA1464 10/12/89 3.6 ug/Kg	G302F2 HA1500 10/12/89 3.4 ug/Kg	G303F1 HA1473 10/10/89 3.5 ug/Kg	G303F2 HA1474 10/11/89 3.5 ug/Kg	SED01FB HA1573 10/11/89 1 ug/L	SED01TB HA1740 10/11/89 NA ug/L	SED02FB HA1571 10/12/89 1 ug/L
PESTICIDES												
Aldrin	0.05	1.7	U	U	U	U	U	U	U	U	NA	U
Alpha-BHC	0.05	1.7	U	U	U	U	U	U	U	U	NA	U
Beta-BHC	0.05	1.7	U	U	U	U	U	U	U	U	NA	U
Gamma-BHC (Lindane)	0.05	1.7	U	U	U	U	U	U	U	U	NA	U
Delta-BHC	0.05	1.7	U	U	U	U	U	U	U	U	NA	U
Chlordane	1.0	33	U	U	U	U	U	U	U	U	NA	U
4,4'-DDT	0.10	3.3	U	U	U	U	U	U	U	U	NA	U
4,4'-DDE	0.10	3.3	60.9	42.6	U	U	U	62.5	U	U	NA	U
4,4'-DDD	2.5	83	55.9	34.4	U	U	U	98	12.5	U	NA	U
Dieldrin	0.10	3.3	U	U	U	U	U	U	U	U	NA	U
Endosulfan I	0.05	1.7	U	U	U	U	U	U	U	U	NA	U
Endosulfan II	0.10	3.3	U	U	U	U	U	U	U	U	NA	U
Endosulfan Sulfate	0.10	3.3	U	U	U	U	U	U	U	U	NA	U
Endrin	0.10	3.3	U	U	U	U	U	U	U	U	NA	U
Endrin Aldehyde	0.10	3.3	U	U	U	U	U	U	U	U	NA	U
Heptachlor	0.05	1.7	U	U	U	U	U	U	U	U	NA	U
Heptachlor Epoxide	0.05	1.7	U	U	U	U	U	U	U	U	NA	U
Toxaphene	2.0	65	U	U	U	U	U	U	U	U	NA	U
Arochlor-1016	0.55	18	U	U	U	U	U	U	U	U	NA	U
Arochlor-1221	0.55	18	U	U	U	U	U	U	U	U	NA	U
Arochlor-1232	0.55	18	U	U	U	U	U	U	U	U	NA	U
Arochlor-1242	0.55	18	U	U	U	U	U	U	U	U	NA	U
Arochlor-1248	0.55	18	U	U	U	U	U	U	U	U	NA	U
Arochlor-1254	1.0	33	U	U	U	U	U	U	U	U	NA	U
Arochlor-1260	1.0	33	U	U	U	U	U	U	U	U	NA	U

continued next page (see last page of table for notes)



**TABLE 2 (continued)**  
**SUMMARY OF ANALYTICAL RESULTS**  
**PHASE I INVESTIGATION**  
**CHEMICAL WASTE MANAGEMENT**  
**CHICAGO, ILLINOIS**

Dames and Moore Sample Number	Quant	Quant	B301F1	B301F1DUP	B301F2	B301F2DUP	G302F2	G303F1	G303F2	SED01FB	SED01TB	SED02FB
Laboratory Sample Number	Limit	Limit	HA1491	HA1492	HA1466	HA1464	HA1500	HA1473	HA1474	HA1573	HA1740	HA1571
Sampling Date	ug/L	ug/Kg	10/12/89	10/12/89	10/12/89	10/12/89	10/12/89	10/10/89	10/11/89	10/11/89	10/11/89	10/12/89
Units	ug/L	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/L	ug/L	ug/L
<b>PRIORITY POLLUTANT INORGANIC PARAMETERS (METALS)</b>												
Antimony	60	6000	BMDL J	BMDL J	17000 J	R	12000	BMDL J	BMDL J	U	NA	U
Arsenic	10	1000	3600	4400	10000 J	8700 J	9700	4200	9600	U	NA	U
Beryllium	1.0	100	700	510	590 J	860 J	430	450	500	U	NA	U
Cadmium	2.0	200	2900	2300	UJ	4500 J	UJ	1300	1600	U	NA	U
Chromium	10	1000	14000	11000	17000 J	20000 J	14000	8100	17000	U	NA	U
Copper	10	1000	24000	21000	32000 J	32000 J	35000	18000	32000	U	NA	U
Lead	5.0	500	220000	130000	48000 J	28000 J	23000	95000	30000	U	NA	U
Mercury	0.20	80	120	110	110 J	BMDL J	U	120	BMDL J	U	NA	U
Nickel	20	1000	12000	13000	25000 J	32000 J	28000	6800	27000	U	NA	U
Selenium	5.0	500	UJ	UJ	UJ	650 J	BMDL J	U	UJ	U	NA	U
Silver	10	1000	3500	3200	BMDL J	1900 J	U	1700	1700	U	NA	U
Thallium	10	1000	U	U	UJ	BMDL J	BMDL J	U	BMDL J	U	NA	U
Zinc	20	2000	352000	170000	85000 J	79000 J	51000	69000	89000	34	NA	76
<b>CONVENTIONAL PARAMETERS</b>												
	mg/L	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/L	mg/L	mg/L
Ammonia as N	0.10	3.0	NA	NA	NA	NA	NA	NA	NA	U	NA	0.031
Chemical Oxygen Demand (COD)	50	50	NA	NA	NA	NA	NA	NA	NA	U	NA	U
Chloride	1.0	1.0	NA	NA	NA	NA	NA	NA	NA	U	NA	U
Sulfate as SO4	5.0	5.0	NA	NA	NA	NA	NA	NA	NA	U	NA	U
Nitrate + Nitrite	0.05	0.05	NA	NA	NA	NA	NA	NA	NA	U	NA	U
pH (s.u.)	—	—	NA	NA	NA	NA	NA	NA	NA	7.28/7.30	NA	7.38J/7.46J
Cyanide, total	0.01	0.5	U	0.943	U	U	U	U	U	U	NA	U
Phenols, total	0.10	3.0	U	U	U	U	U	U	U	U	NA	U

**LEGEND:**

- U Compound was not detected at laboratory method detection limit.
- J Estimated value due to limitations identified during the quality assurance review.
- UJ eported method detection limit is estimated due to limitations identified during the quality assurance review.
- B Compound was detected in a laboratory and/or field blank at similar concentrations. May represent laboratory and/or field contamination.
- R Unreliable result. Compound may or may not be present.
- \* Sample analyzed at multiple dilutions. Summary table is a hybrid of diluted and undiluted results.
- No standard available. Compound was qualitatively searched for.
- NA Not analyzed
- NP Not provided
- IND Indeterminate. Standard and/or spikes could not be detected at method detection limit.
- BMDL Below Method Detection Limit reported by laboratory.
- s.u. Standard Unit

Discrepancies may exist between the laboratory data tables and the data validation summary tables due to variations in the rounding of calculations.

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number Laboratory Sample Number Sampling Date Dilution Factor Units	Quant Limit ug/L	Quant Limit ug/Kg	SED02TB HA1741 10/12/89 1.0 ug/L	SED03FB HA1572 10/12/89 1.0 ug/L	SED03TB HA1742 10/12/89 1.0 ug/L	S1 HA1551 10/12/89 1.0 ug/Kg	S2 HA1536 10/12/89 1.0 ug/Kg	S2DUP HA1537 10/12/89 1.0 ug/Kg	S3 HA1538 10/12/89 5.0 ug/Kg	S3DUP HA1539 10/12/89 1.0 ug/Kg	S4 HA1533 10/12/89 1.0 ug/Kg	S5 HA1532 10/12/89 1.0 ug/Kg
PRIORITY POLLUTANT P/T VOLATILE COMPOUNDS												
Acrolein	100	100	NA	U	NA	NA	NA	NA	NA	NA	NA	NA
Acrylonitrile	100	100	NA	U	NA	NA	NA	NA	NA	NA	NA	NA
Benzene	4.4	4.4	U	U	U	4 J	U	U	U	U	U	U
Bromoform	4.7	4.7	U	U	U	U	U	U	U	U	U	U
Carbon Tetrachloride	2.8	2.8	U	U	U	U	U	U	U	U	U	U
Chlorobenzene	6.0	6.0	U	U	U	U	U	U	U	U	U	U
Chlorodibromomethane	3.1	3.1	U	U	U	U	U	U	U	U	U	U
Chloroethane	10	10	U	U	U	U	U	U	U	U	U	U
2-Chloroethylvinyl ether	10	10	U	U	U	U	U	U	U	U	U	U
Chloroform	1.6	1.6	U	U	U	U	U	U	U	U	U	U
Dichlorobromomethane	2.2	2.2	U	U	U	U	U	U	U	U	U	U
Dichlorodifluoromethane	10	10	U	U	U	U	U	U	U	U	U	U
1,1-Dichloroethane	4.7	4.7	U	U	U	U	U	U	U	U	U	U
1,2-Dichloroethane	2.8	2.8	U	U	U	U	U	U	U	U	U	U
1,1-Dichloroethene	2.8	2.8	U	U	U	U	U	U	U	U	U	U
1,2-Dichloropropane	6.0	6.0	U	U	U	U	U	U	U	U	U	U
cis-1,3-Dichloropropene	5.0	5.0	U	U	U	U	U	U	U	U	U	U
Ethylbenzene	7.2	7.2	U	U	U	U	U	U	U	U	U	U
Methyl bromide	10	10	R	U	R	U	U	U	U	U	U	U
Methyl chloride	10	10	7.33 JB	U	8.66 JB	U	U	U	U	U	U	U
Methylene Chloride	2.8	2.8	U	16 JB	U	10.9 JB	9.41 JB	10.4 JB	432 B	14.1 B	35.4 JB	18.8 J
1,1,2,2-Tetrachloroethane	4.1	4.1	U	U	U	U	U	U	U	U	U	U
Tetrachloroethene	4.1	4.1	U	U	U	U	U	U	U	U	U	U
Toluene	6.0	6.0	U	U	U	U	U	U	U	U	U	U
1,2-Dichloroethene (trans)	1.6	1.6	U	U	U	U	U	U	U	U	3.21 J	2.39 J
1,1,1-Trichloroethane	3.8	3.8	U	U	U	U	U	U	U	U	U	U
1,1,2-Trichloroethane	5.0	5.0	U	U	U	U	U	U	U	U	U	U
Trichloroethene	1.9	1.9	U	U	U	U	U	U	U	U	1.91 J	U
Trichlorofluoromethane	10	10	U	U	U	U	U	U	U	U	U	U
Vinyl Chloride	10	10	U	U	U	U	U	U	U	U	U	U
trans-1,3-Dichloropropene	10	10	U	U	U	U	U	U	U	U	U	U

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number			SED02TB	SED03FB	SED03TB	S1	S2	S2DUP	S3	S3DUP	S4	S5
Laboratory Sample Number			HA1741	HA1572	HA1742	HA1551	HA1536	HA1537	HA1538	HA1539	HA1533	HA1532
Sampling Date			10/12/89	10/12/89	10/12/89	10/12/89	10/12/89	10/12/89	10/12/89	10/12/89	10/12/89	10/12/89
Dilution Factor			NA	1	1	2	1.8	1.9	1.8	1.8	1.3	1.6
Units	Quant	Quant	ug/L	ug/L	ug/L	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
PRIORITY POLLUTANT ACID EXTRACTABLE COMPOUNDS												
2-Chlorophenol	3.9	340	NA	R	NA	U	U	U	U	U	U	U
2,4-Dichlorophenol	3.2	280	NA	R	NA	U	U	U	U	U	U	U
2,4-Dimethylphenol	3.2	280	NA	R	NA	U	U	U	U	U	U	U
4,6-Dinitro-2-methylphenol	29	2400	NA	R	NA	U	U	U	U	U	U	U
2,4-Dinitrophenol	50	4300	NA	R	NA	U	U	U	U	U	U	U
2-Nitrophenol	4.3	370	NA	R	NA	U	U	U	U	U	U	U
4-Nitrophenol	2.9	240	NA	R	NA	U	U	U	U	U	U	U
4-Chloro-3-methylphenol	3.6	310	NA	R	NA	U	U	U	U	U	U	U
Pentachlorophenol	4.3	370	NA	R	NA	U	U	U	U	U	U	U
Phenol	1.8	150	NA	R	NA	881	1160	1080	1070	1210	U	840
2,4,6-Trichlorophenol	3.2	280	NA	R	NA	U	U	U	U	U	U	U

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number Laboratory Sample Number Sampling Date Dilution Factor Units	Quant Limit ug/L	Quant Limit ug/Kg	SED02TB HA1741 10/12/89 NA ug/L	SED03FB HA1572 10/12/89 1.0 ug/L	SED03TB HA1742 10/12/89 NA ug/L	S1 HA1551 10/12/89 2 ug/Kg	S2 HA1536 10/12/89 1.8 ug/Kg	S2DUP HA1537 10/12/89 1.9 ug/Kg	S3 HA1538 10/12/89 1.8 ug/Kg	S3DUP HA1539 10/12/89 1.8 ug/Kg	S4 HA1533 10/12/89 1.3 ug/Kg	S5 HA1532 10/12/89 1.6 ug/Kg
PRIORITY POLLUTANT BASE/NEUTRAL EXTRACTABLE COMPOUNDS												
Acenaphthene	2.3	220	NA	R	NA	287 J	160 J	171 J	U	U	U	U
Acenaphthylene	4.2	410	NA	R	NA	U	U	U	U	U	U	U
Anthracene	2.3	220	NA	R	NA	U	267 J	209 J	239 J	234 J	U	135 J
Benzo(a)anthracene	9.3	910	NA	R	NA	686 J	553 J	546 J	603 J	544 J	U	338 J
Benzo(a)pyrene	3.0	290	NA	R	NA	526	589	U	U	698	U	U
Benzo(b)fluoranthene	5.7	560	NA	R	NA	457 J	483 J	U	U	U	U	266 J
Benzo(g,h,i)perylene	4.9	480	NA	R	NA	UJ	640 J	UJ	UJ	UJ	U	UJ
Benzo(k)fluoranthene	3.0	290	NA	R	NA	402 J	472 J	U	U	U	U	U
bis(2-Chloroethoxy)methane	6.3	620	NA	R	NA	U	U	U	U	U	U	U
Bis(2-chloroethyl) ether	6.8	660	NA	R	NA	U	U	U	U	U	U	U
bis(2-chloroisopropyl) ether	6.8	660	NA	R	NA	U	U	U	U	U	U	U
bis(2-Ethylhexyl)phthalate	12	1200	NA	13.2 JB	NA	1006 J	871 J	815 J	1076 J	823 J	U	263 J
4-Bromophenylphenyl ether	2.3	220	NA	R	NA	U	U	U	U	U	U	U
Butylbenzylphthalate	12	1200	NA	R	NA	UJ	UJ	UJ	UJ	UJ	U	UJ
2-Chloronaphthalene	2.3	220	NA	R	NA	U	U	U	U	U	U	U
4-Chlorophenylphenyl ether	5.0	490	NA	R	NA	U	U	U	U	U	U	U
Chrysene	3.0	290	NA	R	NA	908	843	663	820	759	227 J	424
Dibenz(a,h)anthracene	3.0	290	NA	R	NA	UJ	UJ	UJ	UJ	UJ	U	UJ
1,2-Dichlorobenzene	2.3	220	NA	R	NA	U	U	U	U	U	U	U
1,3-Dichlorobenzene	2.3	220	NA	R	NA	U	U	U	U	U	U	U
1,4-Dichlorobenzene	5.2	510	NA	R	NA	U	U	U	U	U	U	U
3,3'-Dichlorobenzidine	19.6	1920	NA	R	NA	U	U	U	U	U	U	U
Diethylphthalate	12	1200	NA	R	NA	U	447 J	U	232 J	434 J	U	246 J
Dimethylphthalate	12	1200	NA	R	NA	U	U	U	U	U	U	U
Di-n-butylphthalate	12	1200	NA	0.82 J	NA	172 J	224 J	UJ	159 J	UJ	602 J	U
2,4-Dinitrotoluene	6.8	660	NA	R	NA	U	U	U	U	U	U	U
2,6-Dinitrotoluene	2.3	220	NA	R	NA	U	U	U	U	U	U	U
Di-n-octylphthalate	12	1200	NA	R	NA	U	U	U	U	U	U	U
Fluoranthene	2.6	260	NA	R	NA	1280	1340	1180	1220	1370	355	847
Fluorene	2.3	220	NA	R	NA	277 J	231 J	207 J	191 J	198 J	U	U
Hexachlorobenzene	2.3	220	NA	R	NA	U	U	U	U	U	U	U
Hexachlorobutadiene	1.1	100	NA	R	NA	U	U	U	U	U	U	U
Hexachlorocyclopentadiene	12	1200	NA	R	NA	U	UJ	UJ	UJ	UJ	U	U
Hexachloroethane	1.9	190	NA	R	NA	U	U	U	U	U	U	U
Indeno(1,2,3-cd)pyrene	4.4	430	NA	R	NA	UJ	UJ	UJ	UJ	UJ	U	UJ
Isophorone	2.6	260	NA	R	NA	U	U	U	U	U	U	U
Naphthalene	1.9	190	NA	R	NA	241 J	187 J	207 J	172 J	213 J	U	U
Nitrobenzene	2.3	220	NA	R	NA	U	U	U	U	U	U	U
N-Nitroso-dimethylamine	12	1200	NA	R	NA	U	U	U	U	U	U	U
N-Nitroso-di-n-propylamine	12	1200	NA	R	NA	UJ	UJ	UJ	UJ	UJ	U	UJ
N-Nitroso-diphenylamine	2.3	220	NA	R	NA	U	U	U	U	U	U	U
Phenanthrene	6.4	630	NA	R	NA	880 J	903 J	780 J	839 J	850 J	208 J	529 J
Pyrene	2.3	220	NA	R	NA	1280	1230	1120	1070	1230	330	835
1,2,4-Trichlorobenzene	2.3	220	NA	R	NA	U	U	U	U	U	U	U

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number			SED02TB	SED03FB	SED03TB	S1	S2	S2DUP	S3	S3DUP	S4	S5
Laboratory Sample Number			HA1741	HA1572	HA1742	HA1551	HA1536	HA1537	HA1538	HA1539	HA1533	HA1532
Sampling Date			10/12/89	10/12/89	10/12/89	10/12/89	10/12/89	10/12/89	10/12/89	10/12/89	10/12/89	10/12/89
Dilution Factor			NA	1	NA	5.9	5.9	5.8	5.9	5.5	3.8	3.8
Units	Quant Limit ug/L	Quant Limit ug/Kg	ug/L	ug/L	ug/L	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
PESTICIDES												
Aldrin	0.05	1.7	NA	U	NA	U	U	U	U	U	U	U
Alpha-BHC	0.05	1.7	NA	U	NA	U	U	U	U	U	U	U
Beta-BHC	0.05	1.7	NA	U	NA	U	U	U	U	U	U	U
Gamma-BHC (Lindane)	0.05	1.7	NA	U	NA	U	U	U	U	U	U	U
Delta-BHC	0.05	1.7	NA	U	NA	U	U	U	U	U	U	U
Chlordane	1.0	33	NA	U	NA	U	U	U	U	U	U	U
4,4'-DDT	0.10	3.3	NA	U	NA	U	U	U	U	U	U	U
4,4'-DDE	0.10	3.3	NA	U	NA	U	U	U	U	U	U	U
4,4'-DDD	2.5	83	NA	U	NA	U	U	U	U	U	U	U
Dieldrin	0.10	3.3	NA	U	NA	U	U	U	U	U	U	U
Endosulfan I	0.05	1.7	NA	U	NA	U	U	U	U	U	U	U
Endosulfan II	0.10	3.3	NA	U	NA	U	U	U	U	U	U	U
Endosulfan Sulfate	0.10	3.3	NA	U	NA	U	U	U	U	U	U	U
Endrin	0.10	3.3	NA	U	NA	U	U	U	U	U	U	U
Endrin Aldehyde	0.10	3.3	NA	U	NA	U	U	U	U	U	U	U
Heptachlor	0.05	1.7	NA	U	NA	U	U	43.3 J	33.7	35.2	U	U
Heptachlor Epoxide	0.05	1.7	NA	U	NA	U	U	U	U	U	U	U
Toxaphene	2.0	65	NA	U	NA	U	U	U	U	U	U	U
Arochlor-1016	0.55	18	NA	U	NA	U	U	U	U	U	U	U
Arochlor-1221	0.55	18	NA	U	NA	U	U	U	U	U	U	U
Arochlor-1232	0.55	18	NA	U	NA	U	U	U	U	U	U	U
Arochlor-1242	0.55	18	NA	U	NA	U	U	U	U	U	U	U
Arochlor-1248	0.55	18	NA	U	NA	U	U	U	U	U	U	U
Arochlor-1254	1.0	33	NA	U	NA	U	U	U	U	U	U	U
Arochlor-1260	1.0	33	NA	U	NA	U	U	U	U	U	U	U

continued next page (see last page of table for notes)

**TABLE 2 (continued)**  
**SUMMARY OF ANALYTICAL RESULTS**  
**PHASE I INVESTIGATION**  
**CHEMICAL WASTE MANAGEMENT**  
**CHICAGO, ILLINOIS**

Dames and Moore Sample Number Laboratory Sample Number Sampling Date Units	Quant Limit ug/L	Quant Limit ug/Kg	SED02TB HA1741 10/12/89 ug/L	SED03FB HA1572 10/12/89 ug/L	SED03TB HA1742 10/12/89 ug/L	S1 HA1551 10/12/89 ug/Kg	S2 HA1536 10/12/89 ug/Kg	S2DUP HA1537 10/12/89 ug/Kg	S3 HA1538 10/12/89 ug/Kg	S3DUP HA1539 10/12/89 ug/Kg	S4 HA1533 10/12/89 ug/Kg	S5 HA1532 10/12/89 ug/Kg
<b>INORGANIC PARAMETERS (METALS)</b>												
Antimony	60	6000	NA	U	NA	20000	BMDL JB	21000 J	18000	21000	24000 J	BMDL J
Arsenic	10	1000	NA	U	NA	26000	26000	20000	25000	18000	30000	22000
Beryllium	1.0	100	NA	U	NA	590	500	580	450	550	290	230
Cadmium	2.0	200	NA	U	NA	770	680 J	BMDL J	580	430	BMDL J	1400
Calcium	200	20000	NA	NA	NA	75200000	63400000	66200000	63600000	66500000	NA	NA
Chromium	10	10	NA	U	NA	38000	30000	32000	28000	33000	U	8800
Copper	10	10	NA	BMDL J	NA	66000	49000	53000	49000	53000	U	17000
Lead	5.0	5.0	NA	U	NA	120000	91000	97000	88000	110000	U	29000
Magnesium	100	10000	NA	NA	NA	32000000	28900000	30300000	28300000	29800000	NA	NA
Mercury	0.20	80	NA	U	NA	160	BMDL J	160	190	150	U	BMDL J
Nickel	20	1000	NA	U	NA	39000	32000	34000	30000	35000	U	11000
Potassium	500	50000	NA	NA	NA	2000000	1700000	2200000	1300000	1900000	NA	NA
Selenium	5.0	500	NA	U	NA	BMDL J	BMDL J	BMDL J	BMDL J	BMDL J	U	UJ
Silver	10	1000	NA	U	NA	BMDL J	BMDL J	UJ	BMDL J	BMDL J	U	BMDL J
Sodium	500	50000	NA	NA	NA	150000	BMDL J	130000 J	BMDL J	140000	NA	NA
Thallium	10	1000	NA	UJ	NA	U	U	U	BMDL J	U	U	BMDL J
Zinc	20	2000	NA	36	NA	330000	260000	290000	260000	300000	U	160000 J
<b>CONVENTIONAL PARAMETERS</b>												
	mg/L	mg/Kg	mg/L	mg/L	mg/L	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg
Ammonia as N	0.10	3.0	NA	0.065	NA	189	175	115	133	137	69	64
Chemical Oxygen Demand(COD)	50	50	NA	U	NA	75000	100000	99000	92000	90200	58000	35500
Chloride	1.0	1.0	NA	U	NA	135	83	78	82	79	34	24
Sulfate as SO4	5.0	5.0	NA	U	NA	187	U	U	U	U	U	U
Nitrate + Nitrite	0.05	0.05	NA	U	NA	4	1.7	2.5	1.0	2.0	U	2.3
pH (s.u.)	-	-	NA	8.60J/8.63J	NA	7.93/7.98	7.90/7.91	7.96/7.96	8.09/8.12	8.00/8.02	8.42/8.42	8.01/8.03
Cyanide, total	0.01	0.5	NA	U	NA	U	U	U	U	U	U	U
Phenols, total	0.10	3.0	NA	U	NA	U	U	U	U	U	U	U

**LEGEND:**

U Compound was not detected at laboratory method detection limit.  
J Estimated value due to limitations identified during the quality assurance review.  
UJ Reported method detection limit is estimated due to limitations identified during the quality assurance review.  
B Compound was detected in a laboratory and/or field blank at similar concentrations. May represent laboratory and/or field contamination.  
R Unreliable result. Compound may or may not be present.  
\* Sample analyzed at multiple dilutions. Summary table is a hybrid of diluted and undiluted results.  
- No standard available. Compound was qualitatively searched for.  
NA Not analyzed  
NP Not provided  
IND Indeterminate. Standard and/or spikes could not be detected at method detection limit.  
BMDL Below Method Detection Limit reported by laboratory.  
s.u. Standard Unit  
Discrepancies may exist between the laboratory data tables and the data validation summary tables due to variations in the rounding of calculations.

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number	Quant	Quant	S7	S8	S17	S17DUP	S18	S18DUP	S25	S26	S27	FILL03TB
Laboratory Sample Number	Limit	Limit	HA1563	HA1543	HA1534	HA1535	HA1554	HA1555	HA1550	HA1541	HA1540	HA1700
Sampling Date	ug/L	ug/Kg	10/12/89	10/11/89	10/12/89	10/12/89	10/12/89	10/12/89	10/11/89	10/11/89	10/11/89	10/12/89
Dilution Factor	ug/L	ug/Kg	2.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Units	ug/L	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/L
PRIORITY POLLUTANT P/T VOLATILE COMPOUNDS												
Acrolein	100	100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acrylonitrile	100	100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzene	4.4	4.4	U	BMDL	2 J	2 J	2 J	2 J	1 J	BMDL J	U	U
Bromoform	4.7	4.7	U	U	U	U	U	U	U	U	U	U
Carbon Tetrachloride	2.8	2.8	U	U	U	U	U	U	U	U	U	U
Chlorobenzene	6.0	6.0	U	U	U	U	U	U	U	U	U	U
Chlorodibromomethane	3.1	3.1	U	U	U	U	U	U	U	U	U	U
Chloroethane	10	10	U	U	U	U	U	U	U	U	U	U
2-Chloroethylvinyl ether	10	10	U	U	U	U	U	U	U	U	U	U
Chloroform	1.6	1.6	U	U	U	U	U	U	U	U	U	U
Dichlorobromomethane	2.2	2.2	U	U	U	U	U	U	U	U	U	U
Dichlorodifluoromethane	10	10	U	U	U	U	U	U	U	U	U	U
1,1-Dichloroethane	4.7	4.7	U	U	U	U	U	U	U	U	U	U
1,2-Dichloroethane	2.8	2.8	U	U	U	U	U	U	U	U	U	U
1,1-Dichloroethene	2.8	2.8	U	U	U	U	U	U	U	U	U	U
1,2-Dichloropropane	6.0	6.0	U	U	U	U	U	U	U	U	U	U
cis-1,3-Dichloropropene	5.0	5.0	U	U	U	U	U	U	U	U	U	U
Ethylbenzene	7.2	7.2	U	U	U	U	U	U	U	U	U	U
Methyl bromide	10	10	U	U	U	U	U	U	U	U	U	U
Methyl chloride	10	10	U	U	U	U	U	U	U	U	U	U
Methylene Chloride	2.8	2.8	214	13.1	22.1 B	15.4 B	11 B	12.3 B	20.6 B	15.3	13.4	13.1 B
1,1,2,2-Tetrachloroethane	4.1	4.1	U	U	U	U	U	U	U	U	U	U
Tetrachloroethene	4.1	4.1	U	U	U	U	U	U	U	U	U	U
Toluene	6.0	6.0	U	BMDL	1 J	U	U	U	U	U	U	U
1,2-Dichloroethene (trans)	1.6	1.6	U	3.13	1.81 J	2.25 J	U	1.82 J	U	U	2.45	U
1,1,1-Trichloroethane	3.8	3.8	U	U	U	U	U	U	U	U	U	U
1,1,2-Trichloroethane	5.0	5.0	U	U	U	U	U	U	U	U	U	U
Trichloroethene	1.9	1.9	U	U	U	U	U	U	U	U	U	U
Trichlorofluoromethane	10	10	U	U	U	U	U	U	U	U	U	U
Vinyl Chloride	10	10	U	U	U	U	6 J	U	U	U	U	U
trans-1,3-Dichloropropene	10	10	U	U	U	U	U	U	U	U	U	U

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number			S7	S8	S17	S17DUP	S18	S18DUP	S25	S26	S27	FILL03TB
Laboratory Sample Number			HA1563	HA1543	HA1534	HA1535	HA1554	HA1555	HA1550	HA1541	HA1540	HA1700
Sampling Date	Quant	Quant	10/12/89	10/11/89	10/12/89	10/12/89	10/12/89	10/12/89	10/11/89	10/11/89	10/11/89	10/12/89
Dilution Factor	Limit	Limit	1.4	2.0	1.9	1.8	2	1.9	1.8	1.9	22	NA
Units	ug/L	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/L
PRIORITY POLLUTANT ACID EXTRACTABLE COMPOUNDS												
2-Chlorophenol	3.9	340	U	U	U	U	U	U	U	U	U	NA
2,4-Dichlorophenol	3.2	280	U	U	U	U	U	U	U	U	U	NA
2,4-Dimethylphenol	3.2	280	U	U	U	U	U	U	U	U	U	NA
4,6-Dinitro-2-methylphenol	29	2400	U	U	U	U	U	U	U	U	U	NA
2,4-Dinitrophenol	50	4300	U	U	U	U	U	U	U	U	U	NA
2-Nitrophenol	4.3	370	U	U	U	U	U	U	U	U	U	NA
4-Nitrophenol	2.9	240	U	U	U	U	U	U	U	U	U	NA
4-Chloro-3-methylphenol	3.6	310	U	U	U	U	U	U	U	U	U	NA
Pentachlorophenol	4.3	370	U	U	U	U	U	U	U	U	U	NA
Phenol	1.8	150	792	U	U	U	1060	1180	U	U	U	NA
2,4,6-Trichlorophenol	3.2	280	U	U	U	U	U	U	U	U	U	NA

continued next page (see last page of table for notes)



TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number			S7	S8	S17	S17DUP	S18	S18DUP	S25	S26	S27	FILL03TB
Laboratory Sample Number			HA1563	HA1543	HA1534	HA1535	HA1554	HA1555	HA1550	HA1541	HA1540	HA1700
Sampling Date	Quant	Quant	10/12/89	10/11/89	10/12/89	10/12/89	10/12/89	10/12/89	10/11/89	10/11/89	10/11/89	10/12/89
Dilution Factor	Limit	Limit	1.4	1.9	1.9	1.8	2	1.9	1.8	1.7	20	NA
Units	ug/L	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/L
PRIORITY POLLUTANT BASE/NEUTRAL EXTRACTABLE COMPOUNDS												
Acenaphthene	2.3	220	148 J	U	U	318 J	182 J	180 J	U	U	U	NA
Acenaphthylene	4.2	410	U	U	U	U	U	U	U	U	U	NA
Anthracene	2.3	220	349	U	U	U	251 J	661 J	1941 J	U	U	NA
Benzo(a)anthracene	9.3	910	594 J	BMDL	U	360 J	669 J	550 J	733 J	BMDL J	U	NA
Benzo(a)pyrene	3.0	290	539	622	U	396 J	594	550	833	758	U	NA
Benzo(b)fluoranthene	5.7	560	U	BMDL	U	503 J	476 J	550 J	879	BMDL	U	NA
Benzo(g,h,i)perylene	4.9	480	U	BMDL	U	U	766 J	659 J	648 J	BMDL	U	NA
Benzo(k)fluoranthene	3.0	290	U	BMDL	U	257 J	495 J	339 J	586	586	U	NA
bis(2-Chloroethoxy)methane	6.3	620	U	U	U	U	U	U	U	U	U	NA
Bis(2-chloroethyl) ether	6.8	660	U	U	U	U	U	U	U	U	U	NA
bis(2-chloroisopropyl) ether	6.8	660	U	U	U	U	U	U	U	U	U	NA
bis(2-Ethylhexyl)phthalate	12	1200	316 J	U	8160 JB	12800	903 J	737 J	U	U	U	NA
4-Bromophenylphenyl ether	2.3	220	U	U	U	U	U	U	U	U	U	NA
Butylbenzylphthalate	12	1200	U	U	U	U	U	U	U	U	U	NA
2-Chloronaphthalene	2.3	220	U	U	U	U	U	U	U	U	U	NA
4-Chlorophenylphenyl ether	5.0	490	U	U	U	U	U	U	U	U	U	NA
Chrysene	3.0	290	678	557	U	505	934	917	846	875	U	NA
Dibenz(a,h)anthracene	3.0	290	U	U	U	U	U	U	U	U	U	NA
1,2-Dichlorobenzene	2.3	220	U	U	U	U	U	U	U	U	U	NA
1,3-Dichlorobenzene	2.3	220	U	U	U	U	U	U	U	U	U	NA
1,4-Dichlorobenzene	5.2	510	U	U	U	U	U	U	U	U	U	NA
3,3'-Dichlorobenzidine	19.6	1920	U	U	U	U	U	U	U	U	U	NA
Diethylphthalate	12	1200	U	U	U	U	538 J	U	U	U	U	NA
Dimethylphthalate	12	1200	U	U	U	U	U	U	U	U	U	NA
Di-n-butylphthalate	12	1200	U	U	U	U	234 J	152 J	U	U	U	NA
2,4-Dinitrotoluene	6.8	660	U	U	U	U	U	U	U	U	U	NA
2,6-Dinitrotoluene	2.3	220	U	U	U	U	U	U	U	U	U	NA
Di-n-octylphthalate	12	1200	U	U	U	U	U	U	U	U	U	NA
Fluoranthene	2.6	260	1490	973	859 J	611	1480	1490	1230	1590	U	NA
Fluorene	2.3	220	221 J	U	U	270 J	232 J	198 J	183 J	U	U	NA
Hexachlorobenzene	2.3	220	U	U	U	U	U	U	U	U	U	NA
Hexachlorobutadiene	1.1	100	U	U	U	U	U	U	U	U	U	NA
Hexachlorocyclopentadiene	12	1200	U	U	U	U	U	U	U	U	U	NA
Hexachloroethane	1.9	190	U	U	U	U	U	U	U	U	U	NA
Indeno(1,2,3-cd)pyrene	4.4	430	U	U	U	U	248 J	U	233 J	BMDL	U	NA
Isophorone	2.6	260	U	U	U	U	U	U	U	U	U	NA
Naphthalene	1.9	190	214 J	U	U	U	238 J	226 J	U	U	U	NA
Nitrobenzene	2.3	220	U	U	U	U	U	U	U	U	U	NA
N-Nitroso-dimethylamine	12	1200	U	U	U	U	U	U	U	U	U	NA
N-Nitroso-di-n-propylamine	12	1200	U	U	U	U	U	U	U	U	U	NA
N-Nitroso-diphenylamine	2.3	220	U	U	U	U	U	U	U	U	U	NA
Phenanthrene	6.4	630	1200	BMDL	586 J	575 J	926 J	887 J	817 J	BMDL	U	NA
Pyrene	2.3	220	1350	844	750 J	528	1410	1400	1110	1430	U	NA
1,2,4-Trichlorobenzene	2.3	220	U	U	U	U	U	U	U	U	U	NA

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number			S7	S8	S17	S17DUP	S18	S18DUP	S25	S26	S27	FILL03TB
Laboratory Sample Number			HA1563	HA1543	HA1534	HA1535	HA1554	HA1555	HA1550	HA1541	HA1540	HA1700
Sampling Date			10/12/89	10/11/89	10/12/89	10/12/89	10/12/89	10/12/89	10/11/89	10/11/89	10/11/89	10/12/89
Dilution Factor			10.5	6.0	5.6	5.6	5.8	6.5	5.5	5.5	7.0	NA
Units	Quant Limit ug/L	Quant Limit ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/L
PESTICIDES												
Aldrin	0.05	1.7	U	U	U	U	U	U	U	U	U	NA
Alpha-BHC	0.05	1.7	U	U	U	U	U	U	U	U	U	NA
Beta-BHC	0.05	1.7	U	U	U	U	U	U	U	U	U	NA
Gamma-BHC (Lindane)	0.05	1.7	U	U	U	U	U	U	U	U	U	NA
Delta-BHC	0.05	1.7	U	U	U	U	U	U	U	U	U	NA
Chlordane	1.0	33	U	U	U	U	U	U	U	U	U	NA
4,4'-DDT	0.10	3.3	U	U	U	U	U	U	U	U	U	NA
4,4'-DDE	0.10	3.3	U	U	U	U	U	U	U	U	U	NA
4,4'-DDD	2.5	83	U	U	U	U	U	U	U	U	U	NA
Dieldrin	0.10	3.3	U	U	U	U	U	U	U	U	U	NA
Endosulfan I	0.05	1.7	U	U	U	U	U	U	U	U	U	NA
Endosulfan II	0.10	3.3	U	U	U	U	U	U	U	U	U	NA
Endosulfan Sulfate	0.10	3.3	U	U	U	U	U	U	U	U	U	NA
Endrin	0.10	3.3	U	U	U	U	U	U	U	U	U	NA
Endrin Aldehyde	0.10	3.3	U	U	U	U	U	U	U	U	U	NA
Heptachlor	0.05	1.7	17.8	U	U	U	42.9	51	U	U	U	NA
Heptachlor Epoxide	0.05	1.7	U	U	U	U	U	U	U	U	U	NA
Toxaphene	2.0	65	U	U	U	U	U	U	U	U	U	NA
Arochlor-1016	0.55	18	U	U	U	U	U	U	U	U	U	NA
Arochlor-1221	0.55	18	U	U	U	U	U	U	U	U	U	NA
Arochlor-1232	0.55	18	U	U	U	U	U	U	U	U	U	NA
Arochlor-1242	0.55	18	U	U	U	U	U	U	U	U	U	NA
Arochlor-1248	0.55	18	U	U	U	U	U	U	U	U	U	NA
Arochlor-1254	1.0	33	U	U	U	U	U	U	U	U	U	NA
Arochlor-1260	1.0	33	U	U	U	U	U	U	U	U	U	NA

continued next page (see last page of table for notes)

**TABLE 2 (continued)**  
**SUMMARY OF ANALYTICAL RESULTS**  
**PHASE I INVESTIGATION**  
**CHEMICAL WASTE MANAGEMENT**  
**CHICAGO, ILLINOIS**

Dames and Moore Sample Number Laboratory Sample Number Sampling Date Units	Quant Limit ug/L	Quant Limit ug/Kg	S7 HA1563 10/12/89 ug/Kg	S8 HA1543 10/11/89 ug/Kg	S17 HA1534 10/12/89 ug/Kg	S17DUP HA1535 10/12/89 ug/Kg	S18 HA1554 10/12/89 ug/Kg	S18DUP HA1555 10/12/89 ug/Kg	S25 HA1565 10/13/89 ug/Kg	S26 HA1541 10/11/89 ug/Kg	S27 HA1540 10/11/89 ug/Kg	FILL03TB HA1700 10/12/89 ug/L
<b>INORGANIC PARAMETERS (METALS)</b>												
Antimony	60	6000	17000	BMDL J	22000	20000	17000	19000	BMDL J	BMDL J	BMDL J	NA
Arsenic	10	1000	32000	20000	20000	25000	14000	23000	18000	21000	18000	NA
Beryllium	1.0	100	290	680	500	410	350 J	640 J	550	640	990	NA
Cadmium	2.0	200	430	2800	450	400	310 J	620 J	2500	2500	3700	NA
Calcium	200	20000	84200000	76300000	66400000	64500000	42700000	65500000	NA	70600000	62400000	NA
Chromium	10	10	14000	28000	29000	25000	20000	34000	25000	30000	51000	NA
Copper	10	10	28000	57000	53000	48000	34000	54000	44000	49000	74000	NA
Lead	5.0	5.0	56000	110000	94000	77000	63000 J	100000 J	88000	100000	160000	NA
Magnesium	100	10000	43300000	36200000	31500000	29280000	19600000	29700000	NA	31100000	24800000	NA
Mercury	0.20	80	BMDL J	180	170	170	110	180	150	170	180	NA
Nickel	20	1000	18000	31000	36000	30000	22000	36000	25000	28000	43000	NA
Potassium	500	50000	870000	1300000	1700000	1300000	1100000	2300000	NA	1300000	2200000	NA
Selenium	5.0	500	BMDL J	UJ	BMDL J	BMDL J	BMDL J	BMDL J	U	BMDL J	BMDL J	NA
Silver	10	1000	U	2600	U	U	UJ	BMDL J	2300	2200	3100	NA
Sodium	500	50000	BMDL J	110000	120000	98000	95000 J	130000 J	NA	130000	190000	NA
Thallium	10	1000	BMDL J	BMDL J	U	BMDL J	BMDL J	BMDL J	BMDL J	BMDL J	BMDL J	NA
Zinc	20	2000	200000	290000	290000	240000	190000 J	300000 J	260000	280000	410000	NA
<b>CONVENTIONAL PARAMETERS</b>												
Ammonia as N	0.10	3.0	149	182	119	97	61	165	172	132	201	NA
Chemical Oxygen Demand(COD)	50	50	52700	88000	91800	80000	88500	91100	64000	64000	68000	NA
Chloride	1.0	1.0	27	131	78	83	111	90	53.9	87	82	NA
Sulfate as SO4	5.0	5.0	U	204	U	U	117	U	112	124	153	NA
Nitrate + Nitrite	0.05	0.05	5.7	2.6	6.1	3.0	2.9	3.3	2.0	2.5	3.9	NA
pH (s.u.)	-	-	8.34/8.35	8.16/8.19	7.93/7.95	9.74/8.00	7.83/7.85	7.86/7.89	8.19/8.20	8.16/8.19	7.79/7.80	NA
Cyanide, total	0.01	0.5	U	U	U	U	U	U	U	U	U	NA
Phenols, total	0.10	3.0	U	U	U	U	U	U	U	U	U	NA

**LEGEND:**

- U Compound was not detected at laboratory method detection limit.
- J Estimated value due to limitations identified during the quality assurance review.
- UJ Reported method detection limit is estimated due to limitations identified during the quality assurance review.
- B Compound was detected in a laboratory and/or field blank at similar concentrations. May represent laboratory and/or field contamination.
- R Unreliable result. Compound may or may not be present.
- \* Sample analyzed at multiple dilutions. Summary table is a hybrid of diluted and undiluted results.
- No standard available. Compound was qualitatively searched for.
- NA Not analyzed
- NP Not provided
- IND Indeterminate. Standard and/or spikes could not be detected at method detection limit.
- BMDL Below Method Detection Limit reported by laboratory.
- s.u. Standard Unit

Discrepancies may exist between the laboratory data tables and the data validation summary tables due to variations in the rounding of calculations.



**DATA VALIDATION/QUALITY ASSURANCE REVIEW  
PHASE I RCRA FACILITY INVESTIGATION  
CHEM-WASTE MANAGEMENT, INC. - CHICAGO INCINERATOR SITE  
SAMPLE COLLECTION DATES: OCTOBER 17 THROUGH NOVEMBER 7, 1989  
DAMES & MOORE JOB NO.: 13963-055-192**

**LABORATORY REPORT NO.: 350245, 350248, 350253, 350256,  
350263, 350269, 350270, 350271 & 350288**

**INTRODUCTION**

A total of fourteen (14) soil samples, ten (10) sediment samples plus one (1) field-duplicate sediment sample, five (5) surface water samples plus one (1) duplicate surface water sample, two (2) equipment field-blank samples, four (4) field-blank samples and four (4) trip-blank samples were collected and submitted to Environmental Testing and Certification (ETC) of Edison, New Jersey (1992 Illinois Certification No. 100224). The samples included in the review are listed on Table 1.

The soil and field-blank samples were analyzed for Priority Pollutant (PP) Volatile Organic Compounds (VOA), Semivolatile Organic Compounds (BNA), Organochlorine Pesticides and Polychlorinated Biphenyls (PCBs), metals, total cyanide (CN) and total phenol. The sediment and surface water samples were analyzed for Priority Pollutant (PP) Volatile Organic Compounds (VOA), Semivolatile Organic Compounds (BNA), Organochlorine Pesticides and Polychlorinated Biphenyls (PCBs), metals, total cyanide (CN), total phenol, ammonia as N, chemical oxygen demand (COD), chloride, sulfate as SO<sub>4</sub>, nitrate plus nitrite and pH. Additionally, the surface water samples were analyzed for biochemical oxygen demand (BOD), total dissolved solids (TDS), total suspended solids (TSS) and alkalinity as CaCO<sub>3</sub>. One soil and one sediment sample were analysed for volatiles only.

The equipment-blank samples were analyzed for RCRA Appendix IX heated purge and trap (HP/T) VOAs and Appendix IX purge and trap VOAs. The trip-blank samples were analyzed for PP VOAs only. All samples were analyzed following USEPA SW-846 Methodologies.

Data were examined to assess the usability of the results. The organic data quality review is based upon a rigorous review of the reported hold times, surrogate recovery results, blank spike recoveries, matrix spike and matrix spike duplicate analyses, blank contaminants, internal standard area performance, Gas Chromatography/Mass Spectroscopy (GC/MS) tuning and calibration data.

The inorganic and conventional parameter findings offered in this report are based upon review of the reported hold times, blank analysis results, blank spike

recoveries, matrix spike recoveries, duplicate results, instrument calibration verification, post-digestion spike recoveries and Inductively Coupled Plasma (ICP) serial dilution analyses.

The analytical data was presented in an ETC Abbreviated Data Format as requested by Chemical Waste Management, Inc. The laboratory retrieved the archived support documentation for the data validation review; however, not all support documentation was retrievable by the laboratory. Therefore, a quality assurance review rather than data validation is provided for select data points. The quality assurance reviews are not as rigorous as quantitative data validation and for these data, the quality assurance review assumes the analytical results are correct as reported and merely provides an interpretation of the reported quality control results.

Details of the data validation/quality assurance review are presented in the narrative section of the report. The data is summarized in Table 2 of the report. Data qualifiers have been placed next to the results so that the data user can quickly assess the qualitative and/or quantitative reliability of the reported result. This report was prepared to provide a critical review of the laboratory analysis and reported chemical results. Quality assurance reviews of laboratory-generated data routinely identify problems associated with analytical measurements, even from the most experienced and capable laboratories.

This review has been performed in accordance with the requirements specified in the "Laboratory Data Validation Functional Guidelines for Evaluating Organic Analyses" dated February 1988 and "Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses" dated July 1988.

**TABLE 1**

**SAMPLES INCLUDED IN REVIEW**

<u>Sample ID</u>	<u>Lab ID</u>	<u>Collection Date</u>	<u>Analyses Requested*</u>
<u>Laboratory Log Link No. 350245</u>			
G324F1	HA1493	10/17/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
G324F2	HA1494	10/17/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
FILL04EB	HA1522	10/17/89	HP/T VOA, VOA
FILL04TB	HA1744	10/17/89	PP VOA
<u>Laboratory Log Link No. 350248</u>			
P316F1	HA1489	10/18/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
P316F2	HA1490	10/18/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols

Laboratory Log Link No. 350253

S10	HA1544	10/18/89	BNA, Pest/PCBs, Metals, CN, Phenols & Wet Chem Parameters
S11	HA1545	10/18/89	PP VOA, BNA, Pest/PCBs, Metals, CN, Phenols & Wet Chem Parameters
S14	HA1552	10/18/89	BNA, Pest/PCBs, Metals, CN, Phenols & Wet Chem Parameters
S15	HA1553	10/18/89	BNA, Pest/PCBs, CN, Phenols & Wet Chem Parameters
S12	HA1566	10/18/89	BNA, Pest/PCBs, Metals, CN, Phenols & Wet Chem Parameters
S13	HA1567	10/18/89	BNA, Pest/PCBs, Metals, CN, Phenols & Wet Chem Parameters
SEDIME06FB	HA1569	10/18/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
SEDIME05FB	HA1570	10/18/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
S30	HA1687	10/18/89	PP VOA, BNA, Pest/PCBs, Metals, CN, Phenols & Wet Chem Parameters
S16	HA1688	10/18/89	PP VOA, BNA, Pest/PCBs, Metals, CN, Phenols & Wet Chem Parameters
S9	HA1689	10/18/89	PP VOA, BNA, Pest/PCBs, Metals, CN, Phenols & Wet Chem Parameters
S9-Dup	HA1690	10/18/89	PP VOA, BNA, Pest/PCBs, Metals, CN, Phenols & Wet Chem Parameters
SEDIME05TB	HA1764	10/18/89	PP VOA

Laboratory Log Link No. 350256

B335F1	HA1495	10/20/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
B335F2	HA1496	10/20/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols

Laboratory Log Link No. 350263

SW1	HA1580	10/24/89	PP VOA, BNA, Pest/PCBs, Metals, CN, Phenols & Wet Chem Parameters
SW4	HA1581	10/24/89	PP VOA, BNA, Pest/PCBs, Metals, CN, Phenols & Wet Chem Parameters
SW2	HA1582	10/24/89	PP VOA, BNA, Pest/PCBs, Metals, CN, Phenols & Wet Chem Parameters
SW3	HA1583	10/24/89	PP VOA, BNA, Pest/PCBs, Metals, CN, Phenols & Wet Chem Parameters
SW4-Dup	HA1584	10/24/89	PP VOA, BNA, Pest/PCBs, Metals, CN, Phenols & Wet Chem Parameters
SW5	HA1585	10/24/89	PP VOA, BNA, Pest/PCBs, Metals, CN, Phenols & Wet Chem Parameters
SURFWA01FB	HA1586	10/24/89	PP VOA, BNA, Pest/PCBs, Metals, CN, Phenols & Wet Chem Parameters
G324F1	HA1715	10/24/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
G324F2	HA1716	10/24/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
SURFWA01TB	HA1765	10/24/89	PP VOA

Laboratory Log Link No. 350269

G336F1	HA1479	10/26/89	PP VOA, Metals, CN & Phenols
G336F2	HA1480	10/26/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
FILL05EB	HA1520	10/26/89	HP/T VOA, VOA
FILL05TB	HA1766	10/26/89	PP VOA

Laboratory Log Link No. 350270

G317F2	HA1477	10/26/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
G317F1	HA1478	10/26/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols

Laboratory Log Link No. 350271

G343F1	HA1481	10/27/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
G343F2	HA1482	10/27/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
S12	HA1755	10/27/89	PP VOA
S13	HA1756	10/27/89	PP VOA
S14	HA1757	10/27/89	PP VOA
S15	HA1758	10/27/89	PP VOA and Metals
SEDIME06FB	HA1759	10/27/89	PP VOA, BNA, Pest/PCBs, Metals, CN & Phenols
SEDIME06TB	HA1794	10/27/89	PP VOA

Laboratory Log Link No. 350288

S7	HA1803	11/07/89	PP VOA
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Legend:

PP VOA	=	Priority Pollutant Volatile Organic Compounds
HP/T VOA	=	RCRA Appendix IX Heated Purge & Trap Volatile Organic Compounds
VOA	=	RCRA Appendix IX Volatile Organic Compounds
PP BNA	=	Priority Pollutant Semi-volatile Organic Compounds (Base/Neutral/Acid Extractable Compounds)
PP Pest/PCB	=	Priority Pollutant Organochlorine Pesticides and Polychlorinated Biphenyls
PP Metals	=	Priority Pollutant Inorganic Parameters
CN	=	Total Cyanide
Phenols	=	Total Phenol
Wet Chem	=	Ammonia as N, chemical oxygen demand (COD), chloride, sulfate as SO <sub>4</sub> , nitrate plus nitrite and pH, biochemical oxygen demand (BOD), total dissolved solids (TDS), total suspended solids (TSS) and alkalinity as CaCO <sub>3</sub> .



## DATA QUALIFIERS

The data validation review has identified aspects of the analytical data that require qualification. To confidently use any of the data within the data set, the data user should understand the limitations and qualifications presented. With regard to data usability, the following qualifiers are offered based upon the data provided.

### ORGANIC QUALIFIERS

#### Hold Times:

- Samples S13, S16 (LL 350253) and B335F1 (LL 350256) were extracted for semi-volatile compounds 25 days outside the 40 day hold time requirement. The positive results may be biased low and have been flagged (J/UJ) estimated on Table 2. The non-detected results are regarded as unreliable and have been flagged (R) on Table 2.
- Sample P319F2 was analyzed for pesticides/PCBs 2 days outside the 40 day hold time requirement. The confirmatory column analyses was performed 11 days outside hold time. It is this reviewer's opinion, however, that there is no impact on data usability and no qualifier has been applied.

#### Blank Contamination:

- Due to the trace presence of the following volatile organic compounds in the associated laboratory and/or field blank samples, positive results of these compounds in the field samples are qualitatively questionable and have been flagged (B) on Table 2. Reported concentrations which are greater than 5 times the blank concentration (10 times for methylene chloride) are regarded as "real" values and no qualifier is applied.

<u>Analyte</u>	<u>Log Link</u>	<u>Associated Samples</u>
Methylene chloride	350245	FILL04EB, FILL04TB, G324F1, G324F2
	350248	P316F1, P316F2
	350253	All field samples
	350256	All field samples
	350263	All field samples
	350269	All field samples
	350270	All field samples
	350271	All field samples
	350288	S7
Dichlorofluoromethane	350245	FILL04EB

<u>Analyte</u>	<u>Log Link</u>	<u>Associated Samples</u>
1,1,1-Trichloroethane	350271	All field samples

- Due to the trace presence of the following semi-volatile organic compounds (VOAs) in the associated laboratory and/or field blank samples, positive results for these compounds in the field samples are qualitatively questionable and have been flagged (B) on Table 2. Positive concentrations which are greater than five times the blank concentrations (ten times for phthalates) are regarded as "real" values and no qualifier is applied.

<u>Analyte</u>	<u>Log Link</u>	<u>Associated Samples</u>
Bis(2-Ethylhexyl)phthalate & Di-n-octylphthalate	350271	G343F1, G343F2

#### Surrogate Recoveries:

- All volatile surrogate compound recoveries fell within acceptable control limits.
- The base/neutral semi-volatile surrogate compound, terphenyl-d14, fell outside control limits (high) for samples S10, S11, S14, S15, S16, SED-IME06FB, SEDIME05FB, S30, S9 and S9-Dup (LL 350253). No qualifier is required since only one surrogate per fraction fell outside control limits.
- All three base/neutral semi-volatile surrogate compounds, and two acid-extractable surrogate compounds fell outside control limits (high) for sample G324F2 (LL 350245). The positive results may be biased high and have been flagged (J) on Table 2. There is no impact on the non-detected values and no qualifier is applied.
- The acid semi-volatile surrogate compound, phenol-d5, fell outside control limits (high) for samples P316F1, P316F2 (LL 350248), G317F2, G336F2 (LL 350269) and G317F1 (LL 350270). No qualifier is required since only one surrogate per fraction fell outside control limits.
- The acid semi-volatile surrogate compounds, phenol-d5 and 2-fluorophenol, fell outside control limits (high) for sample B335F2 (LL 350256). Positive results may be biased high and have been flagged (J). There is no impact on the non-detected values and no qualifier is required.
- All three acid-extractable semi-volatile surrogate compounds fell outside control limits (low, 0%) for sample SEDIME05FB (LL 350253). The positive results may be biased low and have been flagged (J) on Table 2.

The non-detected results are regarded as unreliable and have been flagged (R) on the summary tables.

- The pesticide surrogate compounds, tetra-chloromethyl-xylene (TCMX) and dibutylchlorodate (DBC), fell outside control limits (high) for samples G324F2 (LL 350245), G316F2 (LL 350248), S9, S13, S16 and S30 (LL 350253). Positive results may be biased high and have been flagged (J) on Table 2. There is no impact on the non-detected results and no qualifier is required.

#### Initial and Continuing Calibration Results:

- In the heated purge & trap (HP/T) volatile analyses of sample FILL04EB (LL 350245) and FILL05EB (LL 350269), the percent difference between the initial and continuing calibration response factors were greater than 50% and less than 90% for all HP/T compounds except isobutyl alcohol. All positive results for the following volatile compounds have been flagged (J) estimated. The actual detection limit may be higher than reported and has been flagged (UJ) estimated in Table 2 of this report.
- Due to the high difference between the initial and continuing calibration response factors (%D >35% and <90%), all positive results for the following volatile compounds have been flagged (J) estimated. The actual detection limit may be higher than reported and has been flagged (UJ) estimated in Table 2 of this report.

<u>Analyte</u>	<u>Log Link</u>	<u>Associated Samples</u>
Bromoform	350248 350253	P316F1 S16
Bromomethane	350245 350253 350269 350270 350271	FILL04TB S11, S9, S9-Dup G336F1, G336F2 G317F1, G317F2 SEDIME06TB
Chloroethane	350245 350253	FILL04TB SEDIME05TB
Chloromethane	350245 350248 350253 350256 350269 350270	G324F1, G324F2 P316F1, P316F2 S10, S16 B335F2 G336F1, G336F2 G317F1, G317F2

<u>Analyte</u>	<u>Log Link</u>	<u>Associated Samples</u>
Chlorodibromomethane	350269 350270	G336F2 G317F1, G317F2
Dichlorodifluoromethane	350269 350270 350271	G336F1, G336F2 G317F1, G317F2 SEDIME06TB
1,2-Dichloropropane & cis-1,3-Dichloropropane	350253 350256	S30 B335F1
Trichlorofluoromethane	350245 350248 350253 350256 350269	FILL04TB, G324F1, G324F2 P316F2 S11, S9, S9-Dup, SEDIME05TB, S10, S30 B335F1, B335F2 G336F1
Trichloroethene	350269 350270	G336F1, G336F2 G317F1, G317F2
1,1,2-Trichloroethane	350269 350270	G336F1, G336F2 G317F1, G317F2
Vinyl chloride	350248 350253 350269	P316F1 SEDIME05TB, S16 G336F1

- Due to the extremely high percent difference between the initial and continuing calibration response factors (%D > 90%), positive result for the following volatile compound have been flagged (J) estimated. The non-detected values are unreliable and have been flagged (R) on Table 2.

<u>Analyte</u>	<u>Log Link</u>	<u>Associated Samples</u>
Vinyl chloride	350248	FILL04FB
Chloroethane	350253 350256	S30 B335F1

- Due to the high difference between the initial and continuing calibration response factors (%D > 35% and < 90%), positive results for the following semi-volatile compounds have been flagged (J) estimated on Table 2.

<u>Analyte</u>	<u>Log Link</u>	<u>Associated Sample</u>
Hexachlorocyclopentadiene	350253 350271	S14, S9-Dup G343F1, G343F2

<u>Analyte</u>	<u>Log Link</u>	<u>Associated Sample</u>
3,3'-Dichlorobenzidine	350253	S14, SEDIME05FB
n-Nitroso-di-phenylamine	350245 350253	G324F1, G324F2 S9
Bis-2(chloroisopropyl)ether	354045 350253	G324F1, G324F2 S9
n-Nitroso-di-propylamine	350253	S10, S11, S15, S16, S30
2,4-Dinitrotoluene	350253 350271	S9-Dup G343F1, G343F2
2,6-Dinitrotoluene	350253 350271	S9-Dup G343F1, G343F2
Dibenzo(ghi)perylene	350253	SEDIME05FB
Di-n-octyl phthalate	350271	G343F1, G343F2
Indeno(1,2,3-c,d) pyrene, Benzo(g,h,i)perylene	350245 350253	G324F1, G324F2 SEDIME05FB
Isophorone	350253	S10, S11, S15, S16, S30
4-Nitrophenol	350245 350253	G324F1, G324F2 S9-Dup
4,6-Dinitro-o-cresol	350253 350271	S9-Dup G343F1, G343F2
p-Chloro-m-cresol	350253	SEDIM06FB
Pyrene	350253	SEDIM06FB
Pentachlorophenol	350253	S9

- For the pesticide/PCB analyses, the correlation coefficient for the initial calibrations fell within acceptable control limits (>0.995) for all samples.
- For the pesticide/PCB analyses, the analytical sequence requirements were met. However, since the standard chromatograms were not available for review (quantitation reports only), no comments can be offered regarding an evaluation of the system performance with regards to adequate peak resolution.

- The DDT/Endrin percent breakdown associated with LL 350245, 350248, 350253 and 350263 (not including G324F1 and G324F2) was evaluated and fell within acceptable control limits.
- The DDT/Endrin percent breakdown associated with LL 350256, samples G324F1 and G324F2 from LL 350263, LL 350269, LL 350270 and LL 350271 were outside control limits (greater than 30%). However, there is no impact on data usability since the field samples were non-detected for DDT, Endrin or their breakdown products.

#### Internal Standard Area Performance:

- The area count of the volatile internal standard, chlorobenzene-d5, associated with samples S9 and S30 (LL 350253) fell outside the control limits (low). The positive and non-detected compounds quantitated against this internal standard for these samples may be biased low and have been flagged (J/UJ) estimated on Table 2.
- The area count of the volatile internal standards, 1,4-difluorobenzene and chlorobenzene-d5, associated with samples P316F2 (LL 350248), G317F2 (LL 350269) and S12 (LL 350271) fell outside the control limits (low). The positive and non-detected compounds quantitated against this internal standard for these samples may be biased low and have been flagged (J/UJ) estimated on Table 2.
- All three volatile internal standards fell outside (low) control limits for samples G324F1, G324F2 (LL 350245), P316F2 (LL 350248), S10, S16 (LL 350253) and B335F2 (LL 350256). The positive and non-detected compounds quantitated against this internal standard for these samples may be biased low and have been flagged (J/UJ) estimated on Table 2.
- The area count of the semi-volatile internal standards, 1,4-dichlorobenzene-d4 and naphthalene-d8, associated with sample S10 (LL 350253) and, 1,4-dichlorobenzene-d4, naphthalene-d8 and phenanthrene-d10, associated with samples S11 and S6 (LL 350253) were reported outside the control limits (low). The positive and non-detected compounds quantitated against these internal standards for these samples may be biased low and have been flagged (J/UJ) estimated on Table 2.
- The area count of the semi-volatile internal standards, 1,4-dichlorobenzene-d4, naphthalene-d8, acenaphthene-d10 and phenanthrene-d10, associated with samples S13 and S16 (LL 350253) was reported outside the control limits (low). The positive and non-detected compounds

quantitated against these internal standards for this samples may be biased low and have been flagged (J/UJ) estimated on Table 2.

- The area count of five semi-volatile internal standards associated with samples S14 and S15 (LL 350253) were reported outside the control limits (low) and six semi-volatile internal standards associated with sample S16 (LL 350253) were reported outside the control limits (low). The positive and non-detected compounds quantitated against these internal standards for this samples may be biased low and have been flagged (J/UJ) estimated on Table 2.
- The area count of the semi-volatile internal standards, phenanthrene-d10, chrysene-d12 and perylene-d12, associated with samples G324F1 (LL 350245) and SEDIME05FB (LL 350253) and chrysene-d12 and perylene-d12, associated with sample SEDIME06FB (LL 350253) were reported outside the control limits (low). The positive and non-detected compounds quantitated against these internal standards for this samples may be biased low and have been flagged (J/UJ) estimated on Table 2.

#### Matrix Spikes (MS) and Matrix Spike Duplicate (MSD) Results:

- In the HP/T volatile analysis of FILL04EB, a high relative percent difference was obtained for the duplicate analysis of methylacrylonitrile. The positive methylacrylonitrile results in sample FILL04EB are regarded as estimated values and have been flagged (J) on Table 2.
- The reported recovery of acrolein in the HP/T volatile analyses could not be confirmed since this compound was not reported on the quantitation reports generated and provided for review.
- In the HP/T volatile analysis, iodomethane was not recovered (0%) for both the blank spike and matrix spike associated with FILL04EB (LL 350245). The result has been reported as "IND" indeterminate by the laboratory. The compound iodomethane may or may not be present in the sample and has been flagged (R) on Table 2.
- Field duplicate samples S9/S9-Dup (LL 350253) and SW4/SW4-Dup (LL 350263) were collected and submitted to the laboratory. Overall, the reproducibility of the organic analyses are good, providing a positive indication of the field techniques and laboratory precision associated with these samples.
- In the MS/MSD analysis of sample S15, a high relative percent difference was obtained for the volatile compounds dichlorodifluoroethane, methyl

bromide and vinyl chloride. The reported positive results are regarded as estimated values in the unspiked sample S15 and have been flagged (J) on Table 2.

- In the semi-volatile analysis of sample P316F1 and P316F2 (LL 350248), the blank spike recoveries were less than 10 percent for the base/neutral compounds, 4-chlorophenylphenyl ether, diethyl phthalate, dimethyl phthalate and fluorene. Positive results in the field samples may be biased low and have been flagged (J) on Table 2. The non-detected values are unreliable (compound may or may not be present) and have been flagged (R).
- In the volatile analysis associated with LL 350271 and 350288, the blank spike recovery was high for toluene. Positive results in the field samples may be biased high and have been flagged (J) on Table 2. There is no impact on the non-detected values and no qualifier is required.

**Additional Comments:**

- As per the requirements, all values calculated below the method detection limit should be considered estimated and have been flagged (J) in Table 2 of this report.



## INORGANIC and CONVENTIONAL PARAMETER QUALIFIERS

### General Comments:

- In the metals fraction, this reviewer has observed that for the ICP concentrations reported at 10 to 15 times above the method detection limit (MDL), the data validation cannot reproduce the laboratory reported results. The calculation obtained during data validation is consistently higher than the laboratory reported concentration. This is due to the fact that the interelement correction factors in the ICP instrument have been externally calculated. Since this external interelement correction factor is not available for review, the reported results for low level samples cannot be reproduced. It should be noted that positive ICP reported results that are significantly above than the MDL were reproduced and validated, since this interelement correction factor becomes negligible at higher concentrations. The data review assumes that the low level reported concentrations are correct as reported and it is this reviewer's opinion that data usability is not impacted.

### Hold Times:

- Sample S11 was digested for mercury 25 days outside the hold time criteria (Log Link 350253). The positive result may be biased low and has been flagged (J) estimate on Table 2.
- All samples (with the exception of mercury for S11) were digested and analyzed within the required hold time criteria for metals and cyanide. The preparation and analysis date of all other wet chemistry parameters was not available for review. Based upon the date of report, it appears that the hold time criteria was met for the majority of these parameters (total cyanide, total phenols, TDS, TSS, alkalinity, chloride, ammonia as N, nitrate plus nitrite, COD); however, no comments can be offered regarding the hold time compliance for pH and BOD.

### Blank Contamination:

- Trace concentrations of selenium and zinc were detected in the laboratory blank associated with Log Link (LL) 350245 and zinc was identified in the laboratory and/or field-blank associated with LL 350248, 350253 and 350256 at concentrations below the reported method detection limit (BMDL). The positive results of these analytes in the field samples reported as BMDL are qualitatively questionable and have been flagged (B) on Table 2. The positive results reported at or above the method

detection limits are regarded as "real" values and no qualifier has been applied.

- Trace concentrations of chromium were identified in the field-blank sample SURFWA01FB associated with LL 350263 at concentrations below the reported method detection limit (BMDL). The reported concentrations in the field samples are qualitatively questionable and have been flagged (B) on Table 2.
- Trace concentrations of copper and zinc were identified in the laboratory blank associated with LL 350269, 350270 and 350271 at concentrations below the reported method detection limit (BMDL). The reported concentrations in the field samples are qualitatively questionable and have been flagged (B) on Table 2. The reported concentrations in the field samples which are greater than 5 times the concentration detected in the field-blank sample and are regarded as "real" values. Therefore, no qualifier has been applied.

#### Inductively Coupled Plasma (ICP) Serial Dilution Results:

- The ICP serial dilution analyses of copper was greater than 10% for sample P316F1 (LL 350248). The positive zinc result in sample P316F1 is regarded as estimated and has been flagged (J) on Table 2.
- The percent difference of the ICP serial dilution analyses of lead for sample S11 (LL 350253) was outside control limits (>10%). The positive lead result in sample S11 is regarded as estimated and has been flagged (J) on Table 2.
- The percent difference of the ICP serial dilution analyses of cadmium, lead and zinc for sample G324F1 (LL 350263) was outside control limits (>10%). The positive lead result in sample S11 is regarded as estimated and has been flagged (J) on Table 2.

#### Matrix Spike (MS) and Duplicate (DU) Summary Results:

- The matrix spike recovery of mercury in the spiked sample B335F1 (LL 350256) was outside (high) control limits. The positive mercury result in the unspiked sample is regarded as estimated and has been flagged (J) on Table 2.
- Due to the high percent difference between the duplicate analyses of arsenic, cadmium, chromium, nickel and zinc for sample P316F1 (LL 350248), and lead in sample S11 (LL 350253) the positive results are

quantitatively questionable and have been flagged (J) estimated on Table 2.

- Due to the high percent difference between the duplicate analyses of zinc for sample G324F1 (LL 350263) the positive results are quantitatively questionable and have been flagged (J) estimated on Table 2.
- Due to the low matrix spike recovery of copper, arsenic and mercury in MS sample S11 (LL 350245), the positive results in the unspiked sample may be biased low and have been flagged (J) on Table 2.
- The matrix spike recoveries of beryllium, nickel, selenium and antimony in MS sample P316F1 (LL 350248) were outside control limits (low). The positive and non-detected results may be biased low and have been flagged (J/UJ) on Table 2.
- The matrix spike recovery of copper in MS sample P316F1 (LL 350248) was outside control limits (high). The positive copper result in the unspiked sample may be biased high and has been flagged (J) on Table 2.
- The matrix spike recoveries of chromium in MS sample P316F1 (LL 350238) was outside control limits (high). No qualifier has been applied since the analyte concentration in the unspiked sample is greater than four times the blank concentration.
- The matrix spike recoveries of antimony and thallium in MS sample G324F1 (LL 350263) were outside control limits (low). The positive and non-detected results may be biased low and have been flagged (J/UJ) on Table 2.
- Field duplicate samples S9/S9-Dup (LL 350253) and SW4/SW4-Dup (LL 350263) were collected and submitted to the laboratory. Overall, the reproducibility of the metals and conventional parameters is good, providing a positive indication of the field and laboratory precision.

#### Post-Digestion Spike Recoveries:

- The post-digestion spike recoveries of the following analytes were outside the control limits (low). Positive and/or non-detected results of these analytes for the associated samples may be biased low and have been flagged (J/UJ) estimated.

<u>Analyte</u>	<u>Log Link</u>	<u>Associated Samples</u>
Arsenic	350253	S16
	350263	SW1, SW4, SW4-Dup
Selenium	350245	G324F2
	350248	P316F2
	350253	S11, S12, S13, S16, S9, S9-Dup
	350256	B335F2
	350263	G324F2
Thallium	350253	S11
	350263	SW1, SW4, SW4-Dup, SW5, G324F2
	350269	G336F1, G336F2
	350270	G317F1, G317F2
	350271	G343F1, S15

**Additional Comments:**

- The laboratory reports several inorganic results as below the method detection limit (BMDL). These are reported as BMDL on Table 2. The actual concentrations are not calculated during the data validation review since the interelement coefficient factors were not provided.

TABLE 2  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number			XFILL04EB	XFILL05EB
Laboratory Sample Number			HA1522	HA1520
Sampling Date	Quant	Quant	10/17/89	10/26/89
Dilution Factor	Limit	Limit	1.0	1.0
Units	ug/L	ug/Kg	ug/L	ug/L
APPENDIX IX HEATED P/T VOLATILE COMPOUNDS				
Acetonitrile	15	15	UJ	UJ
Acrolein	20	20	UJ	UJ
Acrylonitrile	10	10	UJ	UJ
1,4-Dioxane	300	300	UJ	UJ
Ethyl cyanide	40	40	UJ	UJ
Isobutyl alcohol	230	230	U	U
Methacrylonitrile	110	110	3.2 J	UJ

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number			XFILL04EB	XFILL05EB
Laboratory Sample Number			HA1522	HA1520
Sampling Date	Quant	Quant	10/17/89	10/26/89
Dilution Factor	Limit	Limit	1.0	1.0
Units	ug/L	ug/Kg	ug/L	ug/L
APPENDIX IX P/T VOLATILE COMPOUNDS				
Acetone	10	10	U	U
Benzene	4.4	4.4	U	U
Bromoform	4.7	4.7	U	U
Carbon disulfide	10	10	U	U
Carbon Tetrachloride	2.8	2.8	U	U
Chlorobenzene	6.0	6.0	U	U
2-Chloro-1,3-butadiene	-	-	U	U
Chlorodibromomethane	3.1	3.1	U	U
Chloroethane	10	10	U	U
Chloroform	1.6	1.6	U	U
3-Chloropropene	10	10	U	U
Dichlorobromomethane	2.2	2.2	U	U
Dichlorodifluoromethane	10	10	U	U
1,2-Dibromo-3-chloropropane	10	10	U	U
1,2-Dibromoethane	10	10	U	U
1,4-Dichloro-2-butene	10	10	U	U
1,1-Dichloroethane	4.7	4.7	U	U
1,2-Dichloroethane	2.8	2.8	U	U
1,1-Dichloroethene	2.8	2.8	U	U
1,2-Dichloropropane	6.0	6.0	U	U
cis-1,3-Dichloropropene	5.0	5.0	U	U
trans-1,3-Dichloropropene	10	10	U	U
Ethylbenzene	7.2	7.2	U	U
Ethyl methacrylate	10	10	U	U
2-Hexanone	10	10	U	U
Iodomethane	10	10	R	U
Methyl bromide	10	10	U	U
Methyl chloride	10	10	U	U
Methylene Chloride	2.8	2.8	U	U
Methyl isobutyl ketone	10	10	U	U
Methyl ethyl ketone	10	10	U	R
Methyl methacrylate	10	10	U	U
Pentachloroethane	-	-	IND	U
Styrene	10	10	U	U
1,1,2,2-Tetrachloroethane	4.1	4.1	U	U
Tetrachloroethene	4.1	4.1	U	U

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number			XFILL04EB	XFILL05EB
Laboratory Sample Number			HA1522	HA1520
Sampling Date	Quant	Quant	10/17/89	10/26/89
Dilution Factor	Limit	Limit	1.0	1.0
Units	ug/L	ug/Kg	ug/L	ug/L
APPENDIX IX P/T VOLATILE COMPOUNDS (continued)				
Toluene	6.0	6.0	UJ	U
1,2-Dichloroethene (trans)	1.6	1.6	U	U
1,1,1-Trichloroethane	3.8	3.8	U	U
1,1,2-Trichloroethane	5.0	5.0	U	U
1,2,3-Trichloropropane	10	10	U	U
Trichloroethene	1.9	1.9	U	U
Trichlorofluoromethane	10	10	U	U
Vinyl acetate	10	10	U	U
Vinyl Chloride	10	10	U	U
m-Xylene	10	10	U	U
o,p-Xylenes	10	10	U	U

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number Laboratory Sample Number Sampling Date Dilution Factor Units	Quant Limit ug/L	Quant Limit ug/Kg	SG316F1 HA1489 10/18/89 5.0 ug/Kg	SG316F2 HA1490 10/18/89 1.0 ug/Kg	SB335F1 HA1495 10/20/89 1.0 ug/Kg	SB335F2 HA1496 10/20/89 1.0 ug/Kg	SG324F1 HA1493 10/17/89 1.0 ug/Kg	SG324F2 HA1494 10/17/89 1.0 ug/Kg	XFILL04TB HA1744 10/17/89 1.0 ug/L	S7 HA1803 11/07/89 1.0 ug/Kg	S9 HA1689 10/18/89 1.0 ug/Kg	S9-Dup HA1690 10/18/89 1.0 ug/Kg
PRIORITY POLLUTANT P/T VOLATILE COMPOUNDS												
Acrolein	100	100	NA	NA	NA	NA	NA	NA	NA	U	NA	NA
Acrylonitrile	100	100	NA	NA	NA	NA	NA	NA	NA	U	NA	NA
Benzene	4.4	4.4	13.1 J	15.5 J	4.54	4.7 J	1.9 J	1.8 J	U	2.3 J	U	U
Bromoform	4.7	4.7	UJ	UJ	U	UJ	UJ	UJ	U	U	U	U
Carbon Tetrachloride	2.8	2.8	UJ	UJ	U	UJ	UJ	UJ	U	U	U	U
Chlorobenzene	6.0	6.0	UJ	22.6 J	U	UJ	UJ	UJ	U	U	UJ	U
Chlorodibromomethane	3.1	3.1	UJ	UJ	U	UJ	UJ	UJ	U	U	U	U
Chloroethane	10	10	UJ	UJ	R	UJ	UJ	UJ	UJ	U	U	U
2-Chloroethylvinyl ether	10	10	UJ	UJ	U	UJ	UJ	UJ	U	U	U	U
Chloroform	1.6	1.6	UJ	UJ	U	UJ	UJ	UJ	U	U	U	U
Dichlorobromomethane	2.2	2.2	UJ	UJ	U	UJ	UJ	UJ	U	U	U	U
Dichlorodifluoromethane	10	10	UJ	UJ	U	UJ	UJ	UJ	U	U	U	U
1,2-Dibromoethane	10	10	UJ	UJ	U	UJ	UJ	UJ	U	U	U	U
1,1-Dichloroethane	4.7	4.7	UJ	3.1 J	U	UJ	UJ	UJ	U	2.3 J	U	U
1,2-Dichloroethane	2.8	2.8	UJ	1.7 J	U	UJ	UJ	UJ	U	U	U	U
1,1-Dichloroethene	2.8	2.8	UJ	UJ	U	UJ	UJ	UJ	U	U	U	U
1,2-Dichloropropane	6.0	6.0	UJ	UJ	UJ	UJ	UJ	UJ	U	U	U	U
cis-1,3-Dichloropropene	5.0	5.0	UJ	UJ	UJ	UJ	UJ	UJ	U	U	U	U
Ethylbenzene	7.2	7.2	47.2 J	9.17	U	UJ	UJ	UJ	U	U	UJ	U
Methyl bromide	10	10	UJ	UJ	U	UJ	UJ	UJ	U	U	UJ	UJ
Methyl chloride	10	10	UJ	UJ	U	UJ	UJ	UJ	U	U	U	U
Methylene Chloride	2.8	2.8	40.2 JB	23.3 JB	54.0 B	149 JB	22.7 JB	36.9 JB	4.48 JB	17.7 B	10.6 B	11.9 B
1,1,2,2-Tetrachloroethane	4.1	4.1	UJ	UJ	U	UJ	UJ	UJ	U	U	UJ	U
Tetrachloroethene	4.1	4.1	26.7 J	UJ	U	UJ	UJ	UJ	U	U	UJ	U
Toluene	6.0	6.0	116 J	15.5 J	2.6 J	UJ	UJ	UJ	U	1.5 J	UJ	1.4 J
1,2-Dichloroethene (trans)	1.6	1.6	UJ	UJ	U	UJ	1.6 J	2.75 J	U	11.7	U	1.61
1,1,1-Trichloroethane	3.8	3.8	UJ	UJ	U	UJ	2.0 J	UJ	U	U	U	U
1,1,2-Trichloroethane	5.0	5.0	UJ	UJ	U	UJ	UJ	UJ	U	U	U	U
Trichloroethene	1.9	1.9	UJ	UJ	U	UJ	UJ	UJ	U	U	U	U
Trichlorofluoromethane	10	10	UJ	UJ	4.2 J	12.0 J	UJ	UJ	UJ	U	UJ	UJ
Vinyl Chloride	10	10	UJ	UJ	U	UJ	UJ	UJ	R	U	U	U
trans-1,3-Dichloropropene	10	10	UJ	UJ	U	UJ	UJ	UJ	U	U	U	U

continued next page (see last page of table for notes)



TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number			SG316F1	SG316F2	SB335F1	SB335F2	SG324F1	SG324F2	XFILL04TB	S7	S9	S9-Dup
Laboratory Sample Number			HA1489	HA1490	HA1495	HA1496	HA1493	HA1494	HA1744	HA1803	HA1689	HA1690
Sampling Date			10/18/89	10/18/89	10/20/89	10/20/89	10/17/89	10/17/89	10/17/89	11/07/89	10/18/89	10/18/89
Dilution Factor			10.5	21.4	12.0	12.9	13.2	1.2	NA	NA	21.7	11.7
Units	Quant Limit ug/L	Quant Limit ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/L	ug/Kg	ug/Kg	ug/Kg
PRIORITY POLLUTANT ACID EXTRACTABLE COMPOUNDS												
2-Chlorophenol	3.9	340	U	U	R	U	U	U	NA	NA	U	U
2,4-Dichlorophenol	3.2	280	U	U	R	U	U	U	NA	NA	U	U
2,4-Dimethylphenol	3.2	280	U	U	R	U	U	U	NA	NA	U	U
4,6-Dinitro-2-methylphenol	29	2400	U	U	R	U	U	U	NA	NA	U	U
2,4-Dinitrophenol	50	4300	U	U	R	U	U	U	NA	NA	U	U
2-Nitrophenol	4.3	370	U	U	R	U	U	U	NA	NA	U	U
4-Nitrophenol	2.9	240	U	U	R	U	U	U	NA	NA	U	U
4-Chloro-3-methylphenol	3.6	310	U	U	R	U	U	U	NA	NA	U	U
Pentachlorophenol	4.3	370	U	U	R	U	U	U	NA	NA	U	U
Phenol	1.8	150	U	U	R	U	U	U	NA	NA	U	U
2,4,6-Trichlorophenol	3.2	280	U	U	R	U	U	U	NA	NA	U	U

continued next page (see last page of table for)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number Laboratory Sample Number Sampling Date Dilution Factor Units	Quant Limit ug/L	Quant Limit ug/Kg	SG316F1 HA1489 10/18/89 9.5 ug/Kg	SG316F2 HA1490 10/18/89 10.1 ug/Kg	SB335F1 HA1495 10/20/89 10.5 ug/Kg	SB335F2 HA1496 10/20/89 11.4 ug/Kg	SG324F1 HA1493 10/17/89 11.8 ug/Kg	SG324F2 HA1494 10/17/89 1.1 ug/Kg	XFILL04TB HA1744 10/17/89 NA ug/L	S7 HA1803 11/07/89 NA ug/Kg	S9 HA1689 10/18/89 19.1 ug/Kg	S9-Dup HA1690 10/18/89 10.5 ug/Kg
PRIORITY POLLUTANT BASE/NEUTRAL EXTRACTABLE COMPOUNDS												
Acenaphthene	2.3	220	U	U	10000 J	U	18900	835 J	NA	NA	U	U
Acenaphthylene	4.2	410	U	U	R	U	U	U	NA	NA	U	U
Anthracene	2.3	220	U	U	31600 J	U	26400 J	1410 J	NA	NA	U	U
Benzo(a)anthracene	9.3	910	U	U	12400 J	5474 J	42000 J	3190 J	NA	NA	U	U
Benzo(a)pyrene	3.0	290	U	U	35000 J	U	27600 J	2040 J	NA	NA	U	U
Benzo(b)fluoranthene	5.7	560	U	U	R	U	28400 J	2950 J	NA	NA	2036 J	U
Benzo(g,h,i)perylene	4.9	480	U	U	19200 J	U	17300 J	1260 J	NA	NA	U	U
Benzo(k)fluoranthene	3.0	290	U	U	61000 J	U	3255 J	258 J	NA	NA	U	U
bis(2-Chloroethoxy)methane	6.3	620	U	U	R	U	U	U	NA	NA	U	U
Bis(2-chloroethyl) ether	6.8	660	U	U	R	U	U	U	NA	NA	U	U
bis(2-chloroisopropyl) ether	6.8	660	U	U	R	U	U	U	NA	NA	U	U
bis(2-Ethylhexyl)phthalate	12	1200	U	U	R	U	UJ	U	NA	NA	U	U
4-Bromophenylphenyl ether	2.3	220	U	U	R	U	UJ	U	NA	NA	U	U
Butylbenzylphthalate	12	1200	U	U	R	U	UJ	U	NA	NA	U	U
2-Chloronaphthalene	2.3	220	U	U	R	U	U	U	NA	NA	U	U
4-Chlorophenylphenyl ether	5.0	490	R	R	R	U	U	U	NA	NA	U	U
Chrysene	3.0	290	U	U	49000 J	U	38500 J	3280 J	NA	NA	U	U
Dibenz(a,h)anthracene	3.0	290	U	U	R	U	UJ	U	NA	NA	U	U
1,2-Dichlorobenzene	2.3	220	U	U	R	U	U	U	NA	NA	U	U
1,3-Dichlorobenzene	2.3	220	U	U	R	U	U	U	NA	NA	U	U
1,4-Dichlorobenzene	5.2	510	U	U	R	U	U	U	NA	NA	U	U
3,3'-Dichlorobenzidine	19.6	1920	U	U	R	U	UJ	U	NA	NA	U	U
Diethylphthalate	12	1200	R	R	R	U	U	U	NA	NA	U	U
Dimethylphthalate	12	1200	R	R	R	U	U	U	NA	NA	U	U
Di-n-butylphthalate	12	1200	U	U	R	U	UJ	U	NA	NA	U	U
2,4-Dinitrotoluene	6.8	660	U	U	R	U	U	U	NA	NA	U	U
2,6-Dinitrotoluene	2.3	220	U	U	R	U	U	U	NA	NA	U	U
Di-n-octylphthalate	12	1200	U	U	R	U	UJ	U	NA	NA	U	U
Fluoranthene	2.6	260	U	U	117000 J	9950	103000	10900 J	NA	NA	3728 J	1944 J
Fluorene	2.3	220	R	R	19000 J	U	16400	987 J	NA	NA	U	U
Hexachlorobenzene	2.3	220	U	U	R	U	UJ	U	NA	NA	U	U
Hexachlorobutadiene	1.1	100	U	U	R	U	U	U	NA	NA	U	U
Hexachlorocyclopentadiene	12	1200	U	U	R	U	UJ	U	NA	NA	U	U
Hexachloroethane	1.9	190	U	U	R	U	U	U	NA	NA	U	U
Indeno(1,2,3-cd)pyrene	4.4	430	U	U	7510 J	U	6740 J	500 J	NA	NA	U	U
Isophorone	2.6	260	U	U	R	U	U	U	NA	NA	UJ	UJ
Naphthalene	1.9	190	U	U	16000 J	U	8500	2500 J	NA	NA	U	U
Nitrobenzene	2.3	220	U	U	R	U	U	U	NA	NA	U	U
N-Nitroso-dimethylamine	12	1200	U	U	R	U	U	U	NA	NA	U	U
N-Nitroso-di-n-propylamine	12	1200	U	U	R	U	U	U	NA	NA	UJ	UJ
N-Nitroso-diphenylamine	2.3	220	U	U	R	U	UJ	U	NA	NA	U	U
Phenanthrene	6.4	630	U	U	155000 J	6315 J	103000 J	5580 J	NA	NA	U	U
Pyrene	2.3	220	U	U	88600 J	7240	83000 J	8830 J	NA	NA	3616 J	1834 J
1,2,4-Trichlorobenzene	2.3	220	U	U	R	U	U	U	NA	NA	U	U

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number			SG316F1	SG316F2	SB335F1	SB335F2	SG324F1	SG324F2	XFILL04TB	S7	S9	S9-Dup
Laboratory Sample Number			HA1489	HA1490	HA1495	HA1496	HA1493	HA1494	HA1744	HA1803	HA1689	HA1690
Sampling Date	Quant	Quant	10/18/89	10/18/89	10/20/89	10/20/89	10/17/89	10/17/89	10/17/89	11/07/89	10/18/89	10/18/89
Dilution Factor	Limit	Limit	33.5	35.2	3.6	4.2	39.4	35.9	NA	NA	65	3.6
Units	ug/L	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/L	ug/Kg	ug/Kg	ug/Kg
PESTICIDES												
Aldrin	0.05	1.7	U	U	U	U	U	U	NA	NA	U	U
Alpha-BHC	0.05	1.7	U	301	U	U	U	U	NA	NA	U	U
Beta-BHC	0.05	1.7	U	U	U	U	U	U	NA	NA	U	U
Gamma-BHC (Lindane)	0.05	1.7	U	U	U	U	U	U	NA	NA	U	U
Delta-BHC	0.05	1.7	U	U	U	U	U	U	NA	NA	U	U
Chlordane	1.0	33	U	U	U	U	U	U	NA	NA	U	U
4,4'-DDT	0.10	3.3	U	U	U	U	U	U	NA	NA	U	U
4,4'-DDE	0.10	3.3	U	U	U	U	U	U	NA	NA	U	U
4,4'-DDD	2.5	83	U	U	U	U	U	U	NA	NA	U	U
Dieldrin	0.10	3.3	U	U	U	U	U	U	NA	NA	U	U
Endosulfan I	0.05	1.7	U	U	U	U	U	U	NA	NA	U	U
Endosulfan II	0.10	3.3	U	U	U	U	U	U	NA	NA	U	U
Endosulfan Sulfate	0.10	3.3	U	U	U	U	U	U	NA	NA	U	U
Endrin	0.10	3.3	U	U	U	U	U	U	NA	NA	U	U
Endrin Aldehyde	0.10	3.3	U	U	U	U	U	U	NA	NA	U	U
Heptachlor	0.05	1.7	U	U	U	U	U	U	NA	NA	U	U
Heptachlor Epoxide	0.05	1.7	U	U	U	U	U	U	NA	NA	U	U
Toxaphene	2.0	65	U	U	U	U	U	U	NA	NA	U	U
Arochlor-1016	0.55	18	U	U	U	U	U	U	NA	NA	U	U
Arochlor-1221	0.55	18	U	U	U	U	U	U	NA	NA	U	U
Arochlor-1232	0.55	18	U	U	U	U	U	U	NA	NA	U	U
Arochlor-1242	0.55	18	U	U	U	U	U	U	NA	NA	U	U
Arochlor-1248	0.55	18	U	U	U	U	U	U	NA	NA	U	U
Arochlor-1254	1.0	33	U	U	U	U	U	U	NA	NA	U	U
Arochlor-1260	1.0	33	U	U	U	U	U	U	NA	NA	U	U

continued next page (see last page of table for notes)

**TABLE 2 (continued)**  
**SUMMARY OF ANALYTICAL RESULTS**  
**PHASE I INVESTIGATION**  
**CHEMICAL WASTE MANAGEMENT**  
**CHICAGO, ILLINOIS**

Dames and Moore Sample Number Laboratory Sample Number Sampling Date Units	Quant Limit ug/L	Quant Limit ug/Kg	SG316F1 HA1489 10/18/89 ug/Kg	SG316F2 HA1490 10/18/89 ug/Kg	SB335F1 HA1495 10/20/89 ug/Kg	SB335F2 HA1496 10/20/89 ug/Kg	SG324F1 HA1493 10/17/89 ug/Kg	SG324F2 HA1494 10/17/89 ug/Kg	XFILL04TB HA1744 10/17/89 ug/L	S7 HA1803 11/07/89 ug/Kg	S9 HA1689 10/18/89 ug/Kg	S9-Dup HA1690 10/18/89 ug/Kg
<b>INORGANIC PARAMETERS (METALS)</b>												
Antimony	60	6000	10000 J	BMDL J	BMDL J	BMDL J	U	U	NA	NA	BMDL J	BMDL J
Arsenic	10	1000	1500 J	4400	24000	20000	12000	14000	NA	NA	18000	19000
Beryllium	1.0	100	200 J	490	810	800	750	840	NA	NA	780	760
Cadmium	2.0	200	1300 J	1700	2100	960	4300	5000	NA	NA	1900	2100
Calcium	200	20000	NA	NA	NA	NA	NA	NA	NA	NA	62500000	63100000
Chromium	10	10	552000 J	31000	17000	18000	72000	19000	NA	NA	31000	31000
Copper	10	10	25000 J	42000	74000	53000	48000	45000	NA	NA	53000	54000
Lead	5.0	5.0	12000	160000	500000	180000	190000	39000	NA	NA	120000	120000
Magnesium	100	10000	NA	NA	NA	NA	NA	NA	NA	NA	29000000	29100000
Mercury	0.20	80	U	290	840 J	370	240	130	NA	NA	270	210
Nickel	20	1000	9000 J	16000	21000	16000	27000	36000	NA	NA	32000	33000
Potassium	500	50000	NA	NA	NA	NA	NA	NA	NA	NA	2100000	1800000
Selenium	5.0	500	UJ	UJ	BMDL J	BMDL J	BMDL JB	BMDL JB	NA	NA	BMDL J	BMDL J
Silver	10	1000	4700	2400	2400	1600	1900	1800	NA	NA	2200	2400
Sodium	500	50000	NA	NA	NA	NA	NA	NA	NA	NA	230000	230000
Thallium	10	1000	U	BMDL J	2100	1500	BMDL J	1300	NA	NA	BMDL J	BMDL J
Zinc	20	2000	15000 J	220000	371000	150000	160000	76000	NA	NA	270000	280000
<b>CONVENTIONAL PARAMETERS (units)</b>												
Ammonia as N	0.10	3.0	NA	NA	NA	NA	NA	NA	NA	NA	137	130
Chemical Oxygen Demand (COD)	50	50	NA	NA	NA	NA	NA	NA	NA	NA	93000	76700
Chloride	1.0	1.0	NA	NA	NA	NA	NA	NA	NA	NA	58.7	57.6
Sulfate as SO4	5.0	5.0	NA	NA	NA	NA	NA	NA	NA	NA	U	161
Nitrate+Nitrite	0.05	0.05	NA	NA	NA	NA	NA	NA	NA	NA	3.6	9.9
pH	-	-	NA	NA	NA	NA	NA	NA	NA	NA	7.98/7.99	7.64/7.66
Cyanide, total	0.01	0.5	U	U	U	U	U	U	NA	NA	U	U
Phenols, total	0.10	3.0	U	U	U	U	U	U	NA	NA	U	U

**LEGEND:**

- U Compound was not detected at laboratory method detection limit.
- J Estimated value due to limitations identified during the quality assurance review.
- UJ Reported method detection limit is estimated due to limitations identified during the quality assurance review.
- B Compound was detected in a laboratory and/or field blank at similar concentrations. May represent laboratory and/or field contamination.
- R Unreliable result. Compound may or may not be present.
- \* Sample analyzed at multiple dilutions. Summary table is a hybrid of diluted and undiluted results.
- No standard available. Compound was qualitatively searched for.
- NA Not analyzed
- NP Not provided
- IND Indeterminate. Standard and/or spikes could not be detected at method detection limit.
- BMDL Below Method Detection Limit reported by laboratory.

Discrepancies may exist between the laboratory data tables and the data validation summary tables due to variations in the rounding of calculations.

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number			S10	S11	S12	S13	S14	S15	S16	S30	SEDIME05FB	SEDIME06FB	SEDIME05TB	SEDIME06TB
Laboratory Sample Number			HA1544	HA1545	HA1755	HA1507	HA1757	HA1758	HA1688	HA1687	HA1570	HA1569	HA1764	HA1704
Sampling Date			10/18/89	10/18/89	10/27/89	10/27/89	10/27/89	10/27/89	10/18/89	10/18/89	10/18/89	10/18/89	10/18/89	10/27/89
Dilution Factor	Quant Limit	Quant Limit	1.0	1.0	1.0	1.0	1.0	1.0	5.0	1.0	1.0	1.0	1.0	1.0
Units	ug/L	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/L	ug/L	ug/L	ug/L
PRIORITY POLLUTANT P/T VOLATILE COMPOUNDS														
Acrolein	100	100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acrylonitrile	100	100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzene	4.4	4.4	NA	U	UJ	0.99 J	1.0 J	U	U	U	U	U	U	U
Bromoform	4.7	4.7	NA	U	UJ	U	U	U	U	U	U	U	U	U
Carbon Tetrachloride	2.8	2.8	NA	U	UJ	U	U	U	U	U	U	U	U	U
Chlorobenzene	6.0	6.0	NA	U	UJ	U	U	U	UJ	UJ	U	U	U	U
Chlorodibromomethane	3.1	3.1	NA	U	UJ	U	U	U	U	U	U	U	U	U
Chloroethane	10	10	NA	U	U	U	U	U	U	R	U	U	U	UJ
2-Chloroethylvinyl ether	10	10	NA	U	U	U	U	U	U	U	U	U	U	U
Chloroform	1.6	1.6	NA	U	U	U	U	U	U	U	U	U	U	U
Dichlorobromomethane	2.2	2.2	NA	U	UJ	U	U	U	U	U	U	U	U	U
Dichlorodifluoromethane	10	10	NA	U	U	U	U	UJ	U	U	U	U	U	U
1,2-Dibromoethane	10	10	NA	U	U	U	U	U	U	U	U	U	U	U
1,1-Dichloroethane	4.7	4.7	NA	U	U	U	U	U	U	U	U	U	U	U
1,2-Dichloroethane	2.8	2.8	NA	U	U	U	U	U	U	U	U	U	U	U
1,1-Dichloroethene	2.8	2.8	NA	U	U	U	U	U	U	UJ	U	U	U	U
1,2-Dichloropropane	6.0	6.0	NA	U	UJ	U	U	U	U	UJ	U	U	U	U
cis-1,3-Dichloropropene	5.0	5.0	NA	U	UJ	U	U	U	U	UJ	U	U	U	U
Ethylbenzene	7.2	7.2	NA	U	UJ	U	U	0.86 J	UJ	UJ	U	U	U	U
Methyl bromide	10	10	NA	UJ	U	U	U	UJ	U	U	U	U	U	U
Methyl chloride	10	10	NA	U	U	U	U	U	U	U	U	U	U	U
Methylene Chloride	2.8	2.8	NA	12.4 B	16.3 B	16.6 B	14.6 JB	11.5 B	493	8.82 B	6.6 JB	7.27 JB	U	15.6 B
1,1,2,2-Tetrachloroethane	4.1	4.1	NA	U	UJ	U	U	U	U	UJ	U	U	U	U
Tetrachloroethene	4.1	4.1	NA	U	UJ	U	U	U	UJ	UJ	U	U	U	U
Toluene	6.0	6.0	NA	U	1.34 J	U	1.0 J	0.66 J	UJ	UJ	U	U	U	U
1,2-Dichloroethene (trans)	1.6	1.6	NA	U	U	1.98	2.94	11.9	U	U	U	U	U	U
1,1,1-Trichloroethane	3.8	3.8	NA	U	UJ	U	U	U	U	U	U	U	U	U
1,1,2-Trichloroethane	5.0	5.0	NA	U	UJ	U	U	U	U	U	U	U	U	U
Trichloroethene	1.9	1.9	NA	U	UJ	U	U	U	U	U	U	U	U	U
Trichlorofluoromethane	10	10	NA	UJ	U	U	U	U	U	UJ	U	U	U	UJ
Vinyl Chloride	10	10	NA	U	U	U	U	UJ	U	U	U	U	U	U
trans-1,3-Dichloropropene	10	10	NA	U	UJ	U	U	U	U	U	U	U	U	U

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number			S10	S11	S12	S13	S14	S15	S16	S30	SEDIME05FB	SEDIME06FB	SEDIME05TB	SEDIME06TB
Laboratory Sample Number			HA1544	HA1545	HA1566	HA1567	HA1690	HA1544	HA1688	HA1667	HA1570	HA1569	HA1764	HA1794
Sampling Date	Quant	Quant	10/18/89	10/18/89	10/18/89	10/18/89	10/18/89	10/18/89	10/18/89	10/18/89	10/18/89	10/18/89	10/18/89	10/27/89
Dilution Factor	Limit	Limit	25.5	15.3	26.1	12.3	2.9	21.6	13.6	19.1	1.0	1.0	NA	NA
Units	ug/L	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/L	ug/L	ug/L	ug/L
PRIORITY POLLUTANT ACID EXTRACTABLE COMPOUNDS														
2-Chlorophenol	3.9	340	U	U	U	R	U	U	R	U	R	U	NA	NA
2,4-Dichlorophenol	3.2	280	U	U	U	R	U	U	R	U	R	U	NA	NA
2,4-Dimethylphenol	3.2	280	U	U	U	R	U	U	R	U	R	U	NA	NA
4,6-Dinitro-2-methylphenol	29	2400	U	U	U	R	U	UJ	R	U	R	U	NA	NA
2,4-Dinitrophenol	50	4300	U	U	U	R	U	U	R	U	R	U	NA	NA
2-Nitrophenol	4.3	370	U	U	U	R	U	U	R	U	R	U	NA	NA
4-Nitrophenol	2.9	240	U	U	U	R	U	U	R	U	R	U	NA	NA
4-Chloro-3-methylphenol	3.6	310	U	U	U	R	U	U	R	U	R	UJ	NA	NA
Pentachlorophenol	4.3	370	U	U	U	R	U	UJ	R	U	R	U	NA	NA
Phenol	1.8	150	U	U	U	R	U	U	R	U	R	U	NA	NA
2,4,6-Trichlorophenol	3.2	280	U	U	U	R	U	U	R	U	R	U	NA	NA

continued next page (see last page of table)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number	Quant	Quant	S10	S11	S12	S13	S14	S15	S16	S30	SEDIME05FB	SEDIME06FB	SEDIME05TB	SEDIME06TB
Laboratory Sample Number	Limit	Limit	HA1544	HA1545	HA1506	HA1507	HA1090	HA1544	HA1086	HA1087	HA1570	HA1509	HA1764	HA1704
Sampling Date	ug/L	ug/Kg	10/18/89	10/18/89	10/18/89	10/18/89	10/18/89	10/18/89	10/18/89	10/18/89	10/18/89	10/18/89	10/18/89	10/27/89
Dilution Factor			22.7	13.6	23.2	10.9	2.6	19.5	12.3	17.3	1.0	1.0	NA	NA
Units	ug/L	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/L	ug/L	ug/L	ug/L
PRIORITY POLLUTANT BASE/NEUTRAL														
Acenaphthene	2.3	220	U	U	U	R	U	U	R	U	U	U	NA	NA
Acenaphthylene	4.2	410	U	U	U	R	U	U	R	U	U	U	NA	NA
Anthracene	2.3	220	U	U	U	R	U	U	R	U	UJ	U	NA	NA
Benzo(a)anthracene	9.3	910	U	3453 J	U	R	U	U	R	U	UJ	UJ	NA	NA
Benzo(a)pyrene	3.0	290	U	2922 J	U	R	U	U	R	U	UJ	UJ	NA	NA
Benzo(b)fluoranthene	5.7	560	250 J	4031 J	1892 J	R	U	U	R	U	UJ	UJ	NA	NA
Benzo(g,h,i)perylene	4.9	480	U	U	U	R	U	U	R	U	UJ	UJ	NA	NA
Benzo(k)fluoranthene	3.0	290	U	U	U	R	U	U	R	U	UJ	UJ	NA	NA
bis(2-Chloroethoxy)methane	6.3	620	U	U	U	R	U	U	R	U	U	U	NA	NA
Bis(2-chloroethyl) ether	6.8	660	U	U	U	R	U	U	R	U	4.1 J	U	NA	NA
bis(2-chloroisopropyl)ether	6.8	660	U	U	U	R	U	U	R	U	U	U	NA	NA
bis(2-Ethylhexyl)phthalate	12	1200	U	U	U	R	U	U	R	U	1.1 J	UJ	NA	NA
4-Bromophenylphenyl ether	2.3	220	U	U	U	R	U	U	R	U	UJ	U	NA	NA
Butylbenzylphthalate	12	1200	U	U	U	R	U	U	R	U	UJ	UJ	NA	NA
2-Chloronaphthalene	2.3	220	U	U	U	R	U	U	R	U	U	U	NA	NA
4-Chlorophenylphenyl ether	5.0	490	U	U	U	R	U	U	R	U	U	U	NA	NA
Chrysene	3.0	290	U	3469 J	U	R	U	U	R	U	UJ	UJ	NA	NA
Dibenz(a,h)anthracene	3.0	290	U	U	U	R	U	U	R	U	U	UJ	NA	NA
1,2-Dichlorobenzene	2.3	220	U	U	U	R	U	U	R	U	U	U	NA	NA
1,3-Dichlorobenzene	2.3	220	U	U	U	R	U	U	R	U	U	U	NA	NA
1,4-Dichlorobenzene	5.2	510	U	U	U	R	U	U	R	U	U	U	NA	NA
3,3'-Dichlorobenzidine	19.6	1920	U	U	U	R	U	U	R	U	UJ	UJ	NA	NA
Diethylphthalate	12	1200	U	U	U	R	U	U	R	U	U	U	NA	NA
Dimethylphthalate	12	1200	U	U	U	R	U	U	R	U	U	U	NA	NA
Di-n-butylphthalate	12	1200	U	U	U	R	U	U	R	U	U	U	NA	NA
2,4-Dinitrotoluene	6.8	660	U	U	U	R	U	U	R	U	U	U	NA	NA
2,6-Dinitrotoluene	2.3	220	U	U	U	R	U	U	R	U	U	U	NA	NA
Di-n-octylphthalate	12	1200	U	U	U	R	U	U	R	U	UJ	UJ	NA	NA
Fluoranthene	2.6	260	491 J	9410	3522 J	R	1460	4529 J	R	3360 J	U	U	NA	NA
Fluorene	2.3	220	U	U	U	R	U	U	R	U	U	U	NA	NA
Hexachlorobenzene	2.3	220	U	U	U	R	U	U	R	U	UJ	U	NA	NA
Hexachlorobutadiene	1.1	100	U	U	U	R	U	U	R	U	U	U	NA	NA
Hexachlorocyclopentadiene	12	1200	U	U	U	R	U	U	R	U	U	U	NA	NA
Hexachloroethane	1.9	190	U	U	U	R	U	U	R	U	U	U	NA	NA
Indeno(1,2,3-cd)pyrene	4.4	430	U	U	U	R	U	U	R	U	UJ	UJ	NA	NA
Isophorone	2.6	260	UJ	UJ	UJ	R	UJ	UJ	R	UJ	U	U	NA	NA
Naphthalene	1.9	190	U	U	U	R	U	U	R	U	U	U	NA	NA
Nitrobenzene	2.3	220	U	U	U	R	U	U	R	U	U	U	NA	NA
N-Nitroso-dimethylamine	12	1200	U	U	U	R	U	U	R	U	U	U	NA	NA
N-Nitroso-di-n-propylamine	12	1200	UJ	UJ	UJ	R	UJ	UJ	R	UJ	U	U	NA	NA
N-Nitroso-diphenylamine	2.3	220	U	U	U	R	U	U	R	U	UJ	U	NA	NA
Phenanthrene	6.4	630	U	5328 J	U	R	U	2803 J	R	1941 J	UJ	U	NA	NA
Pyrene	2.3	220	467 J	6220	3306 J	R	1360	4660	R	3696 J	UJ	UJ	NA	NA
1,2,4-Trichlorobenzene	2.3	220	U	U	U	R	U	U	R	U	U	U	NA	NA

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number			S10	S11	S12	S13	S14	S15	S16	S30	SEDIME05FB	SEDIME06FB	SEDIME05TB	SEDIME06TB
Laboratory Sample Number			HA1544	HA1545	HA1566	HA1567	HA1690	HA1544	HA1688	HA1687	HA1570	HA1569	HA1764	HA1794
Sampling Date			10/18/89	10/18/89	10/18/89	10/18/89	10/18/89	10/18/89	10/18/89	10/18/89	10/18/89	10/18/89	10/18/89	10/27/89
Dilution Factor	Quant	Quant	76	47	76	76	88	65	40	58	1.0	1.0	NA	1.0
Units	Limit	Limit	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/L	ug/L	ug/L	ug/L
PESTICIDES														
Aldrin	0.05	1.7	U	U	U	U	U	U	U	U	U	U	NA	NA
Alpha-BHC	0.05	1.7	U	U	U	U	301	U	U	U	U	U	NA	NA
Beta-BHC	0.05	1.7	U	U	U	U	U	U	U	U	U	U	NA	NA
Gamma-BHC (Lindane)	0.05	1.7	U	U	U	U	U	U	U	U	U	U	NA	NA
Delta-BHC	0.05	1.7	U	U	U	U	U	U	U	U	U	U	NA	NA
Chlordane	1.0	33	U	U	U	U	U	U	U	U	U	U	NA	NA
4,4'-DDT	0.10	3.3	U	U	U	U	U	U	U	U	U	U	NA	NA
4,4'-DDE	0.10	3.3	U	U	U	U	U	U	U	U	U	U	NA	NA
4,4'-DDD	2.5	83	U	U	U	U	U	U	U	U	U	U	NA	NA
Dieldrin	0.10	3.3	U	U	U	U	U	U	U	U	U	U	NA	NA
Endosulfan I	0.05	1.7	U	U	U	U	U	U	U	U	U	U	NA	NA
Endosulfan II	0.10	3.3	U	U	U	U	U	U	U	U	U	U	NA	NA
Endosulfan Sulfate	0.10	3.3	U	U	U	U	U	U	U	U	U	U	NA	NA
Endrin	0.10	3.3	U	U	U	U	U	U	U	U	U	U	NA	NA
Endrin Aldehyde	0.10	3.3	U	U	U	U	U	U	U	U	U	U	NA	NA
Heptachlor	0.05	1.7	U	U	U	U	U	U	U	U	U	U	NA	NA
Heptachlor Epoxide	0.05	1.7	U	U	U	U	U	U	U	U	U	U	NA	NA
Toxaphene	2.0	65	U	U	U	U	U	U	U	U	U	U	NA	NA
Arochlor-1016	0.55	18	U	U	U	U	U	U	U	U	U	U	NA	NA
Arochlor-1221	0.55	18	U	U	U	U	U	U	U	U	U	U	NA	NA
Arochlor-1232	0.55	18	U	U	U	U	U	U	U	U	U	U	NA	NA
Arochlor-1242	0.55	18	U	U	U	U	U	U	U	U	U	U	NA	NA
Arochlor-1248	0.55	18	U	U	U	U	U	U	U	U	U	U	NA	NA
Arochlor-1254	1.0	33	U	U	U	U	U	U	U	U	U	U	NA	NA
Arochlor-1260	1.0	33	U	U	U	U	U	U	U	U	U	U	NA	NA

continued next page (see last page of table for notes)



TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number Laboratory Sample Number Sampling Date Units	Quant Limit ug/L	Quant Limit ug/Kg	S10 HA1544 10/18/89 ug/Kg	S11 HA1545 10/18/89 ug/Kg	S12 HA1566 10/18/89 ug/Kg	S13 HA1567 10/18/89 ug/Kg	S14 HA1552 10/18/89 ug/Kg	S15 HA1758 10/27/89 ug/Kg	S16 HA1688 10/27/89 ug/Kg	S30 HA1687 10/18/89 ug/Kg	SEDIME06FB HA1570 10/18/89 ug/L	SEDIME06FB HA1569 10/18/89 ug/L	SEDIME05TB HA1764 10/18/89 ug/L	SEDIME06TB HA1794 10/27/89 ug/L
<b>INORGANIC PARAMETERS (METALS)</b>														
Antimony	60	6000	BMDL J	BMDL J	BMDL J	BMDL J	BMDL J	BMDL J	BMDL J	BMDL J	U	U	NA	NA
Arsenic	10	1000	17000	15000 J	17000	12000	3800	17000	27000	16000	U	U	NA	NA
Beryllium	1.0	100	1100	420	880	1000	1000	860	280	1200	U	U	NA	NA
Cadmium	2.0	200	2000	2000	1400	2000	1900	2700	880	3100	U	U	NA	NA
Calcium	200	20000	68200000	59900000	53000000	64500000	61300000	NA	29500000	57000000	NA	NA	NA	NA
Chromium	10	10	39000	15000	32000	38000	37000	36000	9200	72000	U	U	NA	NA
Copper	10	10	57000	31000 J	46000	56000	53000	65000	25000	64000	BMDL J	U	NA	NA
Lead	5.0	5.0	160000	150000 J	130000	150000	150000	170000	33000	130000	U	U	NA	NA
Magnesium	100	10000	24100000	28100000	18200000	22700000	20000000	NA	15200000	18500000	NA	NA	NA	NA
Mercury	0.20	80	250	330 J	240	290	340	320	BMDL J	220	U	U	NA	NA
Nickel	20	1000	39000	20000	33000	39000	41000	40000	13000	37000	U	U	NA	NA
Potassium	500	50000	2900000	700000	2200000	2200000	2400000	NA	630000	1400000	NA	NA	NA	NA
Selenium	5.0	500	BMDL J	UJ	BMDL J	BMDL J	BMDL J	BMDL J	UJ	BMDL J	U	U	NA	NA
Silver	10	1000	BMDL J	2200	BMDL J	BMDL J	BMDL J	BMDL J	BMDL J	2400	U	U	NA	NA
Sodium	500	50000	440000	160000	420000	400000	430000	NA	100000	320000	NA	NA	NA	NA
Thallium	10	1000	BMDL J	BMDL J	BMDL J	BMDL J	BMDL J	BMDL J	BMDL J	BMDL J	UJ	U	NA	NA
Zinc	20	2000	310000	190000	270000	310000	300000	310000	130000	420000	31	73	NA	NA
<b>CONVENTIONAL PARAMETERS (units)</b>														
	mg/L	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg
Ammonia as N	0.10	3.0	184	46.1	164	192	229	174	21.1	164	U	U	NA	NA
Chemical Oxygen Demand (COD)	50	50	116000	62700	107000	110000	110000	110000	50000	111000	7.9	U	NA	NA
Chloride	1.0	1.0	199	73.2	211	188	265	152	27.2	62.4	7.9	U	NA	NA
Sulfate as SO4	5.0	5.0	580	216	634	485	397	510	U	U	U	U	NA	NA
Nitrate + Nitrite	0.05	0.05	10.7	4.4	7.3	4.2	10.4	5.7	3.6	6.7	U	U	NA	NA
pH	—	—	7.55/7.58	8.14/8.16	7.83/7.83	7.86/7.86	7.75/7.77	7.88/7.88	8.46/8.47	8.04/8.04	7.90/7.94	6.45/6.51	NA	NA
Cyanide, total	0.01	0.5	U	U	U	U	U	U	U	U	U	U	NA	NA
Phenols, total	0.10	3.0	U	U	U	U	U	U	U	U	U	U	NA	NA

**LEGEND:**

- U Compound was not detected at laboratory method detection limit.
  - J Estimated value due to limitations identified during the quality assurance review.
  - UJ Reported method detection limit is estimated due to limitations identified during the quality assurance review.
  - B Compound was detected in a laboratory and/or field blank at similar concentrations. May represent laboratory and/or field contamination.
  - R Unreliable result. Compound may or may not be present.
  - \* Sample analyzed at multiple dilutions. Summary table is a hybrid of diluted and undiluted results.
  - No standard available. Compound was qualitatively searched for.
  - NA Not analyzed
  - NP Not provided
  - IND Indeterminate. Standard and/or spikes could not be detected at method detection limit.
  - BMDL Below Method Detection Limit reported by laboratory.
- Discrepancies may exist between the laboratory data tables and the data validation summary tables due to variations in the rounding of calculations.

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number			SG317F1	SG317F2	SG324F1	SG324F	SG336F1	SG336F2	SG343F1	SG343F2
Laboratory Sample Number			HA1478	HA1477	HA1715	HA1716	HA1479	HA1480	HA1481	HA1482
Sampling Date	Quant	Quant	10/26/89	10/26/89	10/24/89	10/24/89	10/26/89	10/26/89	10/27/89	10/27/89
Dilution Factor	Limit	Limit	1.0	1.0	1.0	1.0	2.0	1.0	1.0	1.0
Units	ug/L	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
PRIORITY POLLUTANT P/T VOLATILE COMPOUNDS										
Acrolein	100	100	NA	NA	NA	NA	NA	NA	U	U
Acrylonitrile	100	100	NA	NA	NA	NA	NA	NA	U	U
Benzene	4.4	4.4	U	7.48	5.19	BMDL	44.1	8.31	1.73 J	0.8 J
Bromoform	4.7	4.7	U	U	U	U	UJ	U	U	U
Carbon Tetrachloride	2.8	2.8	U	U	U	U	UJ	U	U	U
Chlorobenzene	6.0	6.0	U	U	6.21	U	20.6	U	U	U
Chlorodibromomethane	3.1	3.1	U	U	U	U	UJ	U	U	U
Chloroethane	10	10	U	U	U	U	U	U	U	U
Chloroform	1.6	1.6	U	U	U	U	U	U	U	U
Dichlorobromomethane	2.2	2.2	U	U	U	U	U	U	U	U
Dichlorodifluoromethane	10	10	UJ	U	U	U	UJ	UJ	UJ	UJ
1,2-Dibromoethane	10	10	U	UJ	U	U	U	U	U	U
1,1-Dichloroethane	4.7	4.7	U	U	U	U	U	U	2.4 J	U
1,2-Dichloroethane	2.8	2.8	U	U	U	U	U	U	U	U
1,1-Dichloroethene	2.8	2.8	U	6.2	U	U	U	U	U	U
1,2-Dichloropropane	6.0	6.0	U	U	U	U	UJ	U	U	U
cis-1,3-Dichloropropene	5.0	5.0	U	U	U	U	UJ	U	U	U
Ethylbenzene	7.2	7.2	U	3.5 J	U	U	UJ	U	0.9 J	U
Methyl bromide	10	10	UJ	UJ	U	U	UJ	UJ	UJ	UJ
Methyl chloride	10	10	UJ	UJ	U	U	UJ	UJ	U	U
Methylene Chloride	2.8	2.8	9.44 B	16.5 B	U	17.3 B	29.3 JB	12.3 B	20.6 B	21.2 B
1,1,2,2-Tetrachloroethane	4.1	4.1	U	U	15.4	U	UJ	U	1.2 J	U
Tetrachloroethene	4.1	4.1	U	U	U	U	UJ	U	0.7 J	U
Toluene	6.0	6.0	3.1 J	13.6	U	BMDL	9.5 J	U	1.1 J	1.2 J
1,2-Dichloroethane (trans)	1.6	1.6	U	U	U	U	UJ	U	1.4 J	1.1 J
1,1,1-Trichloroethane	3.8	3.8	U	U	U	U	UJ	U	1.2 J	U
1,1,2-Trichloroethane	5.0	5.0	U	U	U	U	UJ	U	U	U
Trichloroethene	1.9	1.9	UJ	UJ	U	U	UJ	UJ	U	U
Trichlorofluoromethane	10	10	UJ	UJ	U	U	U	UJ	3.4 J	U
Vinyl Chloride	10	10	UJ	UJ	U	U	U	UJ	UJ	UJ
trans-1,3-Dichloropropene	10	10	U	U	U	U	U	U	U	U

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number			SG317F1	SG317F2	SG324F1	SG324F	SG336F1	SG336F2	SG343F1	SG343F2
Laboratory Sample Number			HA1478	HA1477	HA1715	HA1716	HA1479	HA1480	HA1481	HA1482
Sampling Date	Quant	Quant	10/26/89	10/26/89	10/24/89	10/24/89	10/26/89	10/26/89	10/27/89	10/27/89
Dilution Factor	Limit	Limit	11.1	11.2	11.5	11.7	2.0	11.2	1.1	1.1
Units	ug/L	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
PRIORITY POLLUTANT ACID EXTRACTABLE COMPOUNDS										
2-Chlorophenol	3.9	340	U	U	U	U	NA	U	U	U
2,4-Dichlorophenol	3.2	280	U	U	U	U	NA	U	U	U
2,4-Dimethylphenol	3.2	280	U	U	U	U	NA	U	U	U
4,6-Dinitro-2-methylphenol	29	2400	U	U	U	U	NA	U	UJ	UJ
2,4-Dinitrophenol	50	4300	U	U	U	U	NA	U	U	U
2-Nitrophenol	4.3	370	U	U	U	U	NA	U	U	U
4-Nitrophenol	2.9	240	U	U	U	U	NA	U	U	U
4-Chloro-3-methylphenol	3.6	310	U	U	U	U	NA	U	U	U
Pentachlorophenol	4.3	370	U	U	U	U	NA	U	U	U
Phenol	1.8	150	U	U	U	U	NA	U	U	U
2,4,6-Trichlorophenol	3.2	280	U	U	U	U	NA	U	U	U

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number			SG317F1	SG317F2	SG324F1	SG324F	SG336F1	SG336F2	SG343F1	SG343F2
Laboratory Sample Number			HA1478	HA1477	HA1715	HA1716	HA1479	HA1480	HA1481	HA1482
Sampling Date	Quant	Quant	10/26/89	10/26/89	10/24/89	10/24/89	10/26/89	10/26/89	10/27/89	10/27/89
Dilution Factor	Limit	Limit	10	10	10.5	10.5	2.0	10	1.0	1.0
Units	ug/L	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
PRIORITY POLLUTANT BASE/NEUTRAL EXTRACTABLE COMPOUNDS										
Acenaphthene	2.3	220	U	U	U	U	NA	U	U	U
Acenaphthylene	4.2	410	U	U	U	U	NA	U	U	U
Anthracene	2.3	220	U	U	U	2830	NA	U	U	U
Benzo(a)anthracene	9.3	910	U	U	BMDL	BMDL	NA	U	U	U
Benzo(a)pyrene	3.0	290	U	U	U	U	NA	U	U	U
Benzo(b)fluoranthene	5.7	560	U	U	U	U	NA	U	350 J	U
Benzo(g,h,i)perylene	4.9	480	U	U	U	U	NA	U	U	U
Benzo(k)fluoranthene	3.0	290	U	U	U	U	NA	U	U	U
bis(2-Chloroethoxy)methane	6.3	620	U	U	U	U	NA	U	U	U
Bis(2-chloroethyl) ether	6.8	660	U	U	U	U	NA	U	U	U
bis(2-chloroisopropyl)ether	6.8	660	U	U	U	U	NA	U	U	U
bis(2-Ethylhexyl)phthalate	12	1200	U	U	U	U	NA	U	595 JB	U
4-Bromophenylphenyl ether	2.3	220	U	U	U	U	NA	U	U	U
Butylbenzylphthalate	12	1200	U	U	U	U	NA	U	U	U
2-Chloronaphthalene	2.3	220	U	U	U	U	NA	U	U	U
4-Chlorophenylphenyl ether	5.0	490	U	U	U	U	NA	U	U	U
Chrysene	3.0	290	U	U	U	4690	NA	U	366	U
Dibenz(a,h)anthracene	3.0	290	U	U	4680	U	NA	U	U	U
1,2-Dichlorobenzene	2.3	220	U	U	U	U	NA	U	U	U
1,3-Dichlorobenzene	2.3	220	U	U	U	U	NA	U	U	U
1,4-Dichlorobenzene	5.2	510	U	U	U	U	NA	U	U	U
3,3'-Dichlorobenzidine	19.6	1920	U	U	U	U	NA	U	U	U
Diethylphthalate	12	1200	U	U	U	U	NA	U	U	U
Dimethylphthalate	12	1200	U	U	U	U	NA	U	U	U
Di-n-butylphthalate	12	1200	U	U	U	U	NA	U	U	U
2,4-Dinitrotoluene	6.8	660	U	U	U	U	NA	U	UJ	UJ
2,6-Dinitrotoluene	2.3	220	U	U	U	U	NA	U	UJ	UJ
Di-n-octylphthalate	12	1200	U	U	U	U	NA	U	UJ	UJ
Fluoranthene	2.6	260	U	U	9940	10200	NA	U	682	394
Fluorene	2.3	220	U	U	U	U	NA	U	U	U
Hexachlorobenzene	2.3	220	U	U	U	U	NA	U	U	U
Hexachlorobutadiene	1.1	100	U	U	U	U	NA	U	U	U
Hexachlorocyclopentadiene	12	1200	U	U	U	U	NA	U	UJ	UJ
Hexachloroethane	1.9	190	U	U	U	U	NA	U	U	U
Indeno(1,2,3-cd)pyrene	4.4	430	U	U	U	U	NA	U	U	U
Isophorone	2.6	260	U	U	U	U	NA	U	U	U
Naphthalene	1.9	190	U	U	U	U	NA	U	U	U
Nitrobenzene	2.3	220	U	U	U	U	NA	U	U	U
N-Nitroso-dimethylamine	12	1200	U	U	U	U	NA	U	U	U
N-Nitroso-di-n-propylamine	12	1200	U	U	U	U	NA	U	U	U
N-Nitroso-diphenylamine	2.3	220	U	U	U	U	NA	U	U	U
Phenanthrene	6.4	630	U	198 J	7320	10900	NA	U	447 J	U
Pyrene	2.3	220	U	U	7710	8610	NA	U	650	327
1,2,4-Trichlorobenzene	2.3	220	U	U	U	U	NA	U	U	U

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number			SG317F1	SG317F2	SG324F1	SG324F	SG336F1	SG336F2	SG343F1	SG343F2
Laboratory Sample Number			HA1478	HA1477	HA1715	HA1716	HA1479	HA1480	HA1481	HA1482
Sampling Date	Quant	Quant	10/26/89	10/26/89	10/24/89	10/24/89	10/26/89	10/26/89	10/27/89	10/27/89
Dilution Factor	Limit	Limit	2.9	3.5	3.5	34.7	2.0	3.4	3.5	3.6
Units	ug/L	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
PESTICIDES										
Aldrin	0.05	1.7	U	U	U	U	NA	U	U	U
Alpha-BHC	0.05	1.7	U	U	U	U	NA	U	U	U
Beta-BHC	0.05	1.7	U	U	U	U	NA	U	U	U
Gamma-BHC (Lindane)	0.05	1.7	U	U	U	U	NA	U	U	U
Delta-BHC	0.05	1.7	U	U	U	U	NA	U	U	U
Chlordane	1.0	33	U	U	U	U	NA	U	U	U
4,4'-DDT	0.10	3.3	U	U	U	U	NA	U	U	U
4,4'-DDE	0.10	3.3	U	U	U	U	NA	U	U	U
4,4'-DDD	2.5	83	U	U	U	U	NA	U	U	U
Dieldrin	0.10	3.3	U	U	U	U	NA	U	U	U
Endosulfan I	0.05	1.7	U	U	U	U	NA	U	U	U
Endosulfan II	0.10	3.3	U	U	U	U	NA	U	U	U
Endosulfan Sulfate	0.10	3.3	U	U	U	U	NA	U	U	U
Endrin	0.10	3.3	U	U	U	U	NA	U	U	U
Endrin Aldehyde	0.10	3.3	U	U	U	U	NA	U	U	U
Heptachlor	0.05	1.7	U	U	U	U	NA	U	U	U
Heptachlor Epoxide	0.05	1.7	U	U	U	U	NA	U	U	U
Toxaphene	2.0	65	U	U	U	U	NA	U	U	U
Arochlor-1018	0.55	18	U	U	U	U	NA	U	U	U
Arochlor-1221	0.55	18	U	U	U	U	NA	U	U	U
Arochlor-1232	0.55	18	U	U	U	U	NA	U	U	U
Arochlor-1242	0.55	18	U	U	U	U	NA	U	U	U
Arochlor-1248	0.55	18	U	U	U	U	NA	U	U	U
Arochlor-1254	1.0	33	U	U	U	U	NA	U	U	U
Arochlor-1260	1.0	33	U	U	U	U	NA	U	U	U

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number Laboratory Sample Number Sampling Date Units	Quant Limit ug/L	Quant Limit ug/Kg	SG317F1 HA1478 10/26/89 ug/Kg	SG317F2 HA1477 10/26/89 ug/Kg	SG324F1 HA1715 10/24/89 ug/Kg	SG324F HA1716 10/24/89 ug/Kg	SG336F1 HA1479 10/26/89 ug/Kg	SG336F2 HA1480 10/26/89 ug/Kg	SG343F1 HA1481 10/27/89 ug/Kg	SG343F2 HA1482 10/27/89 ug/Kg
PRIORITY POLLUTANT INORGANIC PARAMETERS (METALS)										
Antimony	60	6000	U	45000	11000 J	8700	BMDL J	7400	BMDL J	BMDL J
Arsenic	10	1000	2400	4100	19000	6400	10000	4200	4200	3000
Beryllium	1.0	100	BMDL J	220	560	470	390	430	210	130
Cadmium	2.0	200	34500	7700	2500 J	3900	3000	2800	1200	910
Calcium	200	20000	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	10	10	140000	1110000	18000	179000	8400	10000	6800	5600
Copper	10	10	46000	47000	58000	25000	36000	34000	14000	7800
Lead	5.0	5.0	35000	72000	180000 J	290000	310000	38000	74000	32000
Magnesium	100	10000	NA	NA	NA	NA	NA	NA	NA	NA
Mercury	0.20	80	U	150	300	180	140	BMDL J	100	BMDL J
Nickel	20	1000	7200	14000	2100	8400	6900	13000	6500	4600
Potassium	500	50000	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	5.0	500	UJ	UJ	BMDL J	UJ	BMDL J	UJ	U	UJ
Silver	10	1000	10000	9500	2000	4800	3700	3500	1900	1500
Sodium	500	50000	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	10	1000	U	U	BMDL J	UJ	U	U	U	U
Zinc	20	2000	41000	99000	180000 J	120000	8500	60000	54000	31000
Cyanide, total	mg/L	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg
Phenols, total	0.010	0.5	U	U	U	U	NA	U	U	U
	0.10	3.0	U	U	U	U	NA	U	U	U

LEGEND:

- U Compound was not detected at laboratory method detection limit.
  - J Estimated value due to limitations identified during the quality assurance review.
  - UJ eported method detection limit is estimated due to limitations identified during the quality assurance review.
  - B Compound was detected in a laboratory and/or field blank at similar concentrations. May represent laboratory and/or field contamination.
  - R Unreliable result. Compound may or may not be present.
  - \* Sample analyzed at multiple dilutions. Summary table is a hybrid of diluted and undiluted results.
  - No standard available. Compound was qualitatively searched for.
  - NA Not analyzed
  - NP Not provided
  - IND Indeterminate. Standard and/or spikes could not be detected at method detection limit.
  - BMDL Below Method Detection Limit reported by laboratory.
- Discrepancies may exist between the laboratory data tables and the data validation summary tables due to variations in the rounding of calculations.

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number Laboratory Sample Number Sampling Date Dilution Factor Units	Quant Limit ug/L	Quant Limit ug/Kg	LSW1 HA1580 10/24/89 1.0 ug/L	LSW2 HA1582 10/24/89 1.0 ug/L	LSW3 HA1583 10/24/89 1.0 ug/L	LSW4 HA1581 10/24/89 NA ug/L	LSW4-Dup HA1584 10/24/89 NA ug/L	LSW5 HA1585 10/24/89 NA ug/L	SURFWA01FE HA1586 10/24/89 NA ug/L	SURFWA01TB HA1765 10/26/89 2.0 ug/L
PRIORITY POLLUTANT P/T VOLATILE COMPOUNDS										
Acrolein	100	100	NA	NA	NA	NA	NA	NA	NA	NA
Acrylonitrile	100	100	NA	NA	NA	NA	NA	NA	NA	NA
Benzene	4.4	4.4	U	U	U	U	U	U	U	U
Bromoform	4.7	4.7	U	U	U	U	U	U	U	U
Carbon Tetrachloride	2.8	2.8	U	U	U	U	U	U	U	U
Chlorobenzene	6.0	6.0	U	U	U	U	U	U	U	U
Chlorodibromomethane	3.1	3.1	U	U	U	U	U	U	U	U
Chloroethane	10	10	U	U	U	U	U	U	U	U
Chloroform	1.6	1.6	U	U	U	U	U	U	U	U
Dichlorobromomethane	2.2	2.2	U	U	U	U	U	U	U	U
Dichlorodifluoromethane	10	10	U	U	U	U	U	U	U	U
1,2-Dibromoethane	10	10	U	U	U	U	U	U	U	U
1,1-Dichloroethane	4.7	4.7	U	U	U	U	U	U	U	U
1,2-Dichloroethane	2.8	2.8	U	U	U	U	U	U	U	U
1,1-Dichloroethene	2.8	2.8	U	U	U	U	U	U	U	U
1,2-Dichloropropane	6.0	6.0	U	U	U	U	U	U	U	U
cis-1,3-Dichloropropene	5.0	5.0	U	U	U	U	U	U	U	U
Ethylbenzene	7.2	7.2	U	U	U	U	U	U	U	U
Methyl bromide	10	10	U	U	U	U	U	U	U	U
Methyl chloride	10	10	U	U	U	U	U	U	U	U
Methylene Chloride	2.8	2.8	U	2.96 B	2.82 B	U	3.17 B	8.69 B	8.49 B	5.89 B
1,1,2,2-Tetrachloroethane	4.1	4.1	U	U	U	U	U	U	U	U
Tetrachloroethene	4.1	4.1	U	U	U	U	U	U	U	U
Toluene	6.0	6.0	U	U	U	U	U	U	U	U
1,2-Dichloroethene (trans)	1.6	1.6	U	U	U	U	U	U	U	U
1,1,1-Trichloroethane	3.8	3.8	U	U	U	U	U	U	U	U
1,1,2-Trichloroethane	5.0	5.0	U	U	U	U	U	U	U	U
Trichloroethene	1.9	1.9	U	U	U	U	U	U	U	U
Trichlorofluoromethane	10	10	U	U	BMDL	U	BMDL	U	U	U
Vinyl Chloride	10	10	U	U	U	U	U	U	U	U
trans-1,3-Dichloropropene	10	10	U	U	U	U	U	U	U	U

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number			LSW1	LSW2	LSW3	LSW4	LSW4-Dup	LSW5	SURFWA01FE	SURFWA01TB
Laboratory Sample Number			HA1580	HA1582	HA1583	HA1581	HA1584	HA1585	HA1586	HA1765
Sampling Date	Quant	Quant	10/24/89	10/24/89	10/24/89	10/24/89	10/24/89	10/24/89	10/24/89	10/26/89
Dilution Factor	Limit	Limit	1.1	1.0	1.4	1.1	1.4	1.0	1.4	NA
Units	ug/L	ug/Kg	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
PRIORITY POLLUTANT ACID EXTRACTABLE COMPOUNDS										
2-Chlorophenol	3.9	340	U	U	U	U	U	U	U	NA
2,4-Dichlorophenol	3.2	280	U	U	U	U	U	U	U	NA
2,4-Dimethylphenol	3.2	280	U	U	U	U	U	U	U	NA
4,6-Dinitro-2-methylphenol	29	2400	U	U	U	U	U	U	U	NA
2,4-Dinitrophenol	50	4300	U	U	U	U	U	U	U	NA
2-Nitrophenol	4.3	370	U	U	U	U	U	U	U	NA
4-Nitrophenol	2.9	240	U	U	U	U	U	U	U	NA
4-Chloro-3-methylphenol	3.6	310	U	U	U	U	U	U	U	NA
Pentachlorophenol	4.3	370	U	U	U	U	U	U	U	NA
Phenol	1.8	150	U	U	U	U	U	U	U	NA
2,4,6-Trichlorophenol	3.2	280	U	U	U	U	U	U	U	NA

continued next page (see last page of table for notes)



TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number Laboratory Sample Number Sampling Date Dilution Factor Units	Quant Limit ug/L	Quant Limit ug/Kg	LSW1 HA1580 10/24/89 1.0 ug/L	LSW2 HA1582 10/24/89 1.0 ug/L	LSW3 HA1583 10/24/89 1.0 ug/L	LSW4 HA1581 10/24/89 1.0 ug/L	LSW4-Dup HA1584 10/24/89 1.0 ug/L	LSW5 HA1585 10/24/89 1.0 ug/L	SURFWA01FE HA1586 10/24/89 1.1 ug/L	SURFWA01TB HA1765 10/26/89 NA ug/L
PRIORITY POLLUTANT BASE/NEUTRAL EXTRACTABLE COMPOUNDS										
Acenaphthene	2.3	220	U	U	U	U	U	U	U	NA
Acenaphthylene	4.2	410	U	U	U	U	U	U	U	NA
Anthracene	2.3	220	U	U	U	U	U	U	U	NA
Benzo(a)anthracene	9.3	910	U	U	U	U	U	U	U	NA
Benzo(a)pyrene	3.0	290	U	U	U	U	U	U	U	NA
Benzo(b)fluoranthene	5.7	560	U	U	U	U	U	U	U	NA
Benzo(g,h,i)perylene	4.9	480	U	U	U	U	U	U	U	NA
Benzo(k)fluoranthene	3.0	290	U	U	U	U	U	U	U	NA
bis(2-Chloroethoxy)methane	6.3	620	U	U	U	U	U	U	U	NA
Bis(2-chloroethyl) ether	6.8	660	U	U	U	U	U	U	U	NA
bis(2-chloroisopropyl)ether	6.8	660	U	U	U	U	U	U	U	NA
bis(2-Ethylhexyl)phthalate	12	1200	U	U	U	U	U	U	U	NA
4-Bromophenylphenyl ether	2.3	220	U	U	U	U	U	U	U	NA
Butylbenzylphthalate	12	1200	U	U	U	U	U	U	U	NA
2-Chloronaphthalene	2.3	220	U	U	U	U	U	U	U	NA
4-Chlorophenylphenyl ether	5.0	490	U	U	U	U	U	U	U	NA
Chrysene	3.0	290	U	U	U	U	U	U	U	NA
Dibenz(a,h)anthracene	3.0	290	U	U	U	U	U	U	U	NA
1,2-Dichlorobenzene	2.3	220	U	U	U	U	U	U	U	NA
1,3-Dichlorobenzene	2.3	220	U	U	U	U	U	U	U	NA
1,4-Dichlorobenzene	5.2	510	U	U	U	U	U	U	U	NA
3,3'-Dichlorobenzidine	19.6	1920	U	U	U	U	U	U	U	NA
Diethylphthalate	12	1200	U	U	U	U	U	U	U	NA
Dimethylphthalate	12	1200	U	U	U	U	U	U	U	NA
Di-n-butylphthalate	12	1200	U	U	U	U	U	U	U	NA
2,4-Dinitrotoluene	6.8	660	U	U	U	U	U	U	U	NA
2,6-Dinitrotoluene	2.3	220	U	U	U	U	U	U	U	NA
Di-n-octylphthalate	12	1200	U	U	U	U	U	U	U	NA
Fluoranthene	2.6	260	U	U	U	U	U	U	U	NA
Fluorene	2.3	220	U	U	U	U	U	U	U	NA
Hexachlorobenzene	2.3	220	U	U	U	U	U	U	U	NA
Hexachlorobutadiene	1.1	100	U	U	U	U	U	U	U	NA
Hexachlorocyclopentadiene	12	1200	U	U	U	U	U	U	U	NA
Hexachloroethane	1.9	190	U	U	U	U	U	U	U	NA
Indeno(1,2,3-cd)pyrene	4.4	430	U	U	U	U	U	U	U	NA
Isophorone	2.6	260	U	U	U	U	U	U	U	NA
Naphthalene	1.9	190	U	U	U	U	U	U	U	NA
Nitrobenzene	2.3	220	U	U	U	U	U	U	U	NA
N-Nitroso-dimethylamine	12	1200	U	U	U	U	U	U	U	NA
N-Nitroso-di-n-propylamine	12	1200	U	U	U	U	U	U	U	NA
N-Nitroso-diphenylamine	2.3	220	U	U	U	U	U	U	U	NA
Phenanthrene	6.4	630	U	U	U	U	U	U	U	NA
Pyrene	2.3	220	U	U	U	U	U	U	U	NA
1,2,4-Trichlorobenzene	2.3	220	U	U	U	U	U	U	U	NA

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number			LSW1	LSW2	LSW3	LSW4	LSW4-Dup	LSW5	SURFWA01FE	SURFWA01TB
Laboratory Sample Number			HA1580	HA1582	HA1583	HA1581	HA1584	HA1585	HA1586	HA1785
Sampling Date	Quant	Quant	10/24/89	10/24/89	10/24/89	10/24/89	10/24/89	10/24/89	10/24/89	10/26/89
Dilution Factor	Limit	Limit	1.0	1.0	1.0	1.0	1.0	1.0	1.1	NA
Units	ug/L	ug/Kg	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
<b>PESTICIDES</b>										
Aldrin	0.05	1.7	U	U	U	U	U	U	U	NA
Alpha-BHC	0.05	1.7	U	U	U	U	U	U	U	NA
Beta-BHC	0.05	1.7	U	U	U	U	U	U	U	NA
Gamma-BHC (Lindane)	0.05	1.7	U	U	U	U	U	U	U	NA
Delta-BHC	0.05	1.7	U	U	U	U	U	U	U	NA
Chlordane	1.0	33	U	U	U	U	U	U	U	NA
4,4'-DDT	0.10	3.3	U	U	U	U	U	U	U	NA
4,4'-DDE	0.10	3.3	U	U	U	U	U	U	U	NA
4,4'-DDD	2.5	83	U	U	U	U	U	U	U	NA
Dieldrin	0.10	3.3	U	U	U	U	U	U	U	NA
Endosulfan I	0.05	1.7	U	U	U	U	U	U	U	NA
Endosulfan II	0.10	3.3	U	U	U	U	U	U	U	NA
Endosulfan Sulfate	0.10	3.3	U	U	U	U	U	U	U	NA
Endrin	0.10	3.3	U	U	U	U	U	U	U	NA
Endrin Aldehyde	0.10	3.3	U	U	U	U	U	U	U	NA
Heptachlor	0.05	1.7	U	U	U	U	U	U	U	NA
Heptachlor Epoxide	0.05	1.7	U	U	U	U	U	U	U	NA
Toxaphene	2.0	65	U	U	U	U	U	U	U	NA
Arochlor-1016	0.55	18	U	U	U	U	U	U	U	NA
Arochlor-1221	0.55	18	U	U	U	U	U	U	U	NA
Arochlor-1232	0.55	18	U	U	U	U	U	U	U	NA
Arochlor-1242	0.55	18	U	U	U	U	U	U	U	NA
Arochlor-1248	0.55	18	U	U	U	U	U	U	U	NA
Arochlor-1254	1.0	33	U	U	U	U	U	U	U	NA
Arochlor-1260	1.0	33	U	U	U	U	U	U	U	NA

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number Laboratory Sample Number Sampling Date Units	Quant Limit ug/L	Quant Limit ug/Kg	LSW1 HA1580 10/24/89 ug/L	LSW2 HA1582 10/24/89 ug/L	LSW3 HA1583 10/24/89 ug/L	LSW4 HA1581 10/24/89 ug/L	LSW4 - Dup HA1584 10/24/89 ug/L	LSW5 HA1585 10/24/89 ug/L	SURFWA01FE HA1586 10/24/89 ug/L	SURFWA01TB HA1765 10/26/89 ug/L
<b>PRIORITY POLLUTANT INORGANIC PARAMETERS (METALS)</b>										
Antimony	60	6000	BMDL J	U	BMDL J	U	BMDL J	U	U	NA
Arsenic	10	1000	UJ	U	U	UJ	UJ	U	U	NA
Beryllium	1.0	100	U	U	U	U	U	U	U	NA
Cadmium	2.0	200	NA	U	U	NA	NA	NA	NA	NA
Calcium	200	20000	45700	41500	38900	38700	38700	39500	U	NA
Chromium	10	10	BMDL JB	BMDL JB	BMDL JB	BMDL JB	BMDL JB	BMDL JB	BMDL J	NA
Copper	10	10	BMDL J	U	U	U	U	U	U	NA
Lead	5.0	5.0	BMDL J	U	U	U	BMDL J	U	U	NA
Magnesium	100	10000	15100	27600	12500	12200	12200	12400	U	NA
Mercury	0.20	80	U	U	U	U	U	U	U	NA
Nickel	20	1000	U	U	U	U	U	U	U	NA
Potassium	500	50000	4800	14000	2800	2700	2800	3000	U	NA
Selenium	5.0	500	U	U	U	U	U	U	U	NA
Silver	10	1000	U	U	U	U	U	U	U	NA
Sodium	500	50000	58500	71800	26000	24000	25000	26000	U	NA
Thallium	10	1000	UJ	U	U	UJ	UJ	UJ	U	NA
Zinc	20	2000	NA	NA	NA	NA	NA	NA	22	NA
<b>CONVENTIONAL PARAMETERS (Units)</b>	<b>mg/L</b>	<b>mg/Kg</b>	<b>mg/L</b>	<b>mg/L</b>	<b>mg/L</b>	<b>mg/L</b>	<b>mg/L</b>	<b>mg/L</b>	<b>mg/L</b>	<b>mg/L</b>
Chloride	1.0	5.0	90.2	101	40.5	40.6	40.6	40.9	U	NA
Total Organic Carbon (TOC)	0.05	NA	5.9/7.4	12.5/13.1	3.5/3.5	3.9/4.4	3.3/3.5	3.5/3.6	1.2/1.2	NA
Specific Conductance	um/cm	NA	594/595	781/782	402/402	405/406	404/404	402/402	U	NA
pH	s.u.	s.u.	7.75/7.76	7.84/7.85	7.95/7.95	7.94/7.95	8.02/8.02	7.99/8.00	7.62/7.76	NA
Chemical Oxygen Demand (COD)	10	50	24	34	12	U	U	U	U	NA
Nitrate + Nitrite	0.05	0.05	0.453	0.158	0.363	0.387	0.353	0.367	U	NA
Ammonia as N	0.10	3.0	2.8	2.0	0.48	0.29	0.24	0.34	0.15	NA
Biochemical Oxygen Demand (BOD)	2.0	NA	4.0	4.0	2.0	2.0	2.0	2.0	U	NA
Sulfate as SO <sub>4</sub>	5.0	5.0	45.8	114	34.8	36.0	34.0	34.3	U	NA
Total Dissolved Solids (TDS)	10	NA	300	430	220	200	200	220	U	NA
Total Suspended Solids (TSS)	5.0	NA	124	44	42	38	40	54	U	NA
Alkalinity as CaCO <sub>3</sub>	10	NA	120	140	120	120	88	120	U	NA
Cyanide, total	0.010	0.5	U	U	U	U	U	U	U	NA
Phenols, total	0.10	3.0	U	U	U	U	U	U	U	NA

**LEGEND:**

- U Compound was not detected at laboratory method detection limit.
- J Estimated value due to limitations identified during the quality assurance review.
- UJ Reported method detection limit is estimated due to limitations identified during the quality assurance review.
- B Compound was detected in a laboratory and/or field blank at similar concentrations. May represent laboratory and/or field contamination.
- R Unreliable result. Compound may or may not be present.
- \* Sample analyzed at multiple dilutions. Summary table is a hybrid of diluted and undiluted results.
- No standard available. Compound was qualitatively searched for.
- NA Not analyzed
- NP Not provided
- IND Indeterminate. Standard and/or spikes could not be detected at method detection limit.

BMDL Below Method Detection Limit reported by laboratory.

Discrepancies may exist between the laboratory data tables and the data validation summary tables due to variations in the rounding of calculations.



**DATA VALIDATION/QUALITY ASSURANCE REVIEW  
PHASE I RCRA FACILITY INVESTIGATION  
CHEM-WASTE MANAGEMENT, INC. - CHICAGO INCINERATOR SITE  
SAMPLE COLLECTION DATES: NOVEMBER 16 TO DECEMBER 5, 1989  
DAMES & MOORE JOB NO.: 13963-055-192**

**LABORATORY REPORT NO.: 350304, 350305, 350306, 350307,  
350308, 350309, 350317 & 350319**

**INTRODUCTION**

A total of twenty five (25) groundwater samples plus four (4) duplicate groundwater samples, three (3) field-blank samples and three (3) trip-blank samples were collected and submitted to Environmental Testing and Certification (ETC) of Edison, New Jersey (1992 Illinois Certification No. 100224). The samples included in the review are listed on Table 1. The groundwater and field-blank samples were analyzed for RCRA Appendix IX Heated Purge & Trap Volatile Organic Compounds (HP/T VOA), Volatile Organic Compounds (P/T VOA), Semivolatile Organic Compounds (BNA), Organochlorine and Nitrogen/Phosphorous Pesticides, Polychlorinated Biphenyls (PCBs), Herbicides, polychlorinated dibenzo-p-dioxins and polychlorinated dibenzofurans (PCDD & PCDF), Metals, total Cyanide (CN), Chloride, Sulfate as SO<sub>4</sub> and Sulfide as S. The trip-blank samples were analyzed for HP/T VOAs and RCRA Appendix IX VOAs only. All samples were analyzed following USEPA SW-846 Methodologies.

Data were examined to assess the usability of the results. The organic data quality review is based upon a rigorous review of the reported hold times, surrogate recovery results, blank spike recoveries, matrix spike and matrix spike duplicate analyses, blank contaminants, internal standard area performance, Gas Chromatography/Mass Spectroscopy (GC/MS) tuning and calibration data.

The polychlorinated dibenzo-p-dioxins and dibenzofuran review is based upon a review of the reported hold times, blank spike recoveries, matrix spike and matrix spike duplicate summaries, blank contaminants, internal standard area performance, calibration data and selected ion relative intensities.

The inorganic and conventional parameter findings offered in this report are based upon review of the reported hold times, blank analysis results, blank spike recoveries, matrix spike recoveries, duplicate results, instrument calibration verification, post-digestion spike recoveries and Inductively Coupled Plasma (ICP) serial dilution analyses.

The analytical data was presented in an ETC Abbreviated Data Format as requested by Chemical Waste Management, Inc. The laboratory retrieved the archived support documentation for the data validation review; however, not all support documentation was retrievable by the laboratory. Therefore, a quality assurance review rather than data validation is provided for select data points. The quality assurance reviews are not as rigorous as quantitative data validation and for these data, the quality assurance review assumes the analytical results are correct as reported and merely provides an interpretation of the reported quality control results.

Details of the data validation/quality assurance review are presented in the narrative section of the report. The data is summarized in Table 2 of the report. Data qualifiers have been placed next to the results so that the data user can quickly assess the qualitative and/or quantitative reliability of the reported result. This report was prepared to provide a critical review of the laboratory analysis and reported chemical results. Quality assurance reviews of laboratory-generated data routinely identify problems associated with analytical measurements, even from the most experienced and capable laboratories.

This review has been performed in accordance with the requirements specified in the "Laboratory Data Validation Functional Guidelines for Evaluating Organic Analyses" dated February 1988 and "Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses" dated July 1988.

**TABLE 1**

**SAMPLES INCLUDED IN REVIEW**

<u>Sample ID</u>	<u>Lab ID</u>	<u>Collection Date</u>	<u>Analyses Requested*</u>
<u>Laboratory Log Link No. 350304</u>			
G314	HA1816	11/16/89	HP/T VOA, P/T VOA, BNA, Pesticides, PCBs, Herbicides, PCDD/PCDF, Metals, CN & Wet Chem
G336	HA1820	11/16/89	HP/T VOA, P/T VOA, BNA, Pesticides, PCBs, Herbicides, PCDD/PCDF, Metals, CN & Wet Chem
G308	HA1823	11/16/89	HP/T VOA, P/T VOA, BNA, Pesticides, PCBs, Herbicides, PCDD, PCDF, Metals, CN & Wet Chem
<u>Laboratory Log Link No. 350305</u>			
G347	HA1817	11/17/89	HP/T VOA, P/T VOA, BNA, Pesticides, PCBs, Herbicides, PCDD/PCDF, Metals, CN & Wet Chem
G344	HA1822	11/17/89	HP/T VOA, P/T VOA, BNA, Pesticides, PCBs, Herbicides, PCDD/PCDF, Metal & Wet Chem

<u>Sample ID</u>	<u>Lab ID</u>	<u>Collection Date</u>	<u>Analyses Requested*</u>
<u>Laboratory Log Link No. 350306</u>			
G343	HA1818	11/20/89	HP/T VOA, P/T VOA, BNA, Pesticides, PCBs, Herbicides, PCDD/PCDF, Metals, CN & Wet Chem
G334	HA1819	11/20/89	HP/T VOA, BNA, Pesticides, PCBs, Herbicides, PCDD/-PCDF, Metals, CN & Wet Chem
G307	HA1821	11/20/89	HP/T VOA, P/T VOA, BNA, Pesticides, PCBs, Herbicides, PCDD/PCDF, Metals, CN & Wet Chem
G349	HA1824	11/20/89	HP/T VOA, P/T VOA, BNA, Pesticides, PCBs, Herbicides, PCDD/PCDF, Metals, CN & Wet Chem
01FB	HA1838	11/20/89	HP/T VOA, P/T VOA, BNA, Pesticides, PCBs, Herbicides, PCDD/PCDF, Metals, CN & Wet Chem
G348-Dup	HA1825	11/20/89	HP/T VOA, P/T VOA, BNA, Pesticides, PCBs, Herbicides, PCDD/PCDF, Metals, CN & Wet Chem
<u>Laboratory Log Link No. 350307</u>			
G348-Dup	HA1825	11/21/89	HP/T VOA, P/T VOA, BNA, Pesticides, PCBs, Herbicides, PCDD/PCDF, Metals, CN & Wet Chem
G348	HA1826	11/21/89	HP/T VOA, P/T VOA, BNA, Pesticides, PCBs, Herbicides, PCDD/PCDF, Metals, CN & Wet Chem
G330	HA1827	11/21/89	HP/T VOA, P/T VOA, BNA, Pesticides, PCBs, Herbicides, PCDD/PCDF, Metals, CN & Wet Chem
G342	HA1828	11/21/89	HP/T VOA, P/T VOA, BNA, Pesticides, PCBs, Herbicides, PCDD/PCDF, Metals, CN & Wet Chem
G330-Dup	HA1829	11/21/89	HP/T VOA, P/T VOA, BNA, Pesticides, PCBs, Herbicides, PCDD/PCDF, Metals, CN & Wet Chem
G344	HA1852	11/21/89	CN
<u>Laboratory Log Link No. 350308</u>			
G123S	HA1804	11/27/89	HP/T VOA, P/T VOA, BNA, Pesticides, PCBs, Herbicides, PCDD/PCDF, Metals, CN & Wet Chem
G120S	HA1805	11/27/89	HP/T VOA, P/T VOA, BNA, Pesticides, PCBs, Herbicides, PCDD/PCDF, Metals, CN & Wet Chem
DUP	HA1806	11/27/89	HP/T VOA, P/T VOA, BNA, Pesticides, PCBs, Herbicides, PCDD/PCDF, Metals, CN & Wet Chem
01TB	HA1810	11/27/89	HP/T VOA, P/T VOA
<u>Laboratory Log Link No. 350309</u>			
G124S	HA1807	11/27/89	HP/T VOA, P/T VOA, BNA, Pesticides, PCBs, Herbicides, PCDD/PCDF, Metals, CN & Wet Chem
06FB	HA1809	11/28/89	HP/T VOA, P/T VOA, BNA, Pesticides, PCBs, Herbicides, PCDD/PCDF, Metals, CN & Wet Chem
G332	HA1830	11/28/89	HP/T VOA, P/T VOA, BNA, Pesticides, PCBs, Herbicides, PCDD/PCDF, Metals, CN & Wet Chem
G324	HA1831	11/28/89	HP/T VOA, P/T VOA, BNA, Pesticides, PCBs, Herbicides, PCDD/PCDF, Metals, CN & Wet Chem

<u>Sample ID</u>	<u>Lab ID</u>	<u>Collection Date</u>	<u>Analyses Requested*</u>
<u>Laboratory Log Link No. 350309 (continued)</u>			
02FB	HA1839	11/28/89	HP/T VOA, P/T VOA, BNA, Pesticides, PCBs, Herbicides, PCDD/PCDF, Metals, CN & Wet Chem
02TB	HA1840	11/28/89	HP/T VOA, P/T VOA

Laboratory Log Link No. 350317

G303	HA1836	12/04/89	HP/T VOA, P/T VOA, BNA, Pesticides, PCBs, Herbicides, PCDD/PCDF, Metals, CN & Wet Chem
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Laboratory Log Link No. 350319

G121S	HA1808	12/05/89	HP/T VOA, P/T VOA, BNA, Pesticides, PCBs, Herbicides, PCDD/PCDF, Metals, CN & Wet Chem
G302	HA1815	12/05/89	HP/T VOA, P/T VOA, BNA, Pesticides, PCBs, Herbicides, PCDD/PCDF, Metals, CN & Wet Chem
G302-Dup	HA1832	12/05/89	HP/T VOA, P/T VOA, BNA, Pesticides, PCBs, Herbicides, PCDD/PCDF, Metals, CN & Wet Chem
G317	HA1833	12/05/89	Not available for review.
G305	HA1834	12/05/89	HP/T VOA, P/T VOA, BNA, Pesticides, PCBs, Herbicides, PCDD/PCDF, Metals, CN
G318	HA1835	12/05/89	HP/T VOA, P/T VOA, BNA, Pesticides, PCBs, Herbicides, PCDD/PCDF, Metals, CN & Wet Chem
G337	HA1837	12/05/89	HP/T VOA, P/T VOA, BNA, Pesticides, PCBs, Herbicides, PCDD/PCDF, Metals, CN & Wet Chem

Legend:

HP/T VOA	=	RCRA Appendix IX Heated Purge & Trap Volatile Organic Compounds
P/T VOA	=	RCRA Appendix IX Volatile Organic Compounds
BNA	=	RCRA Appendix IX Semi-volatile Organic Compounds (Base/Neutral/Acid Extractable Compounds)
Pest	=	RCRA Appendix IX Organochlorine and Nitrogen/Phosphorous Pesticides
PCB	=	RCRA Appendix IX Polychlorinated Biphenyls
PCDD/PCDF	=	Polychlorinated Dibenzo-p-dioxins and Polychlorinated Dibenzofurans
Metals	=	RCRA Appendix IX Inorganic Parameters
CN	=	Total Cyanide
Wet Chem	=	Chloride, Sulfate (as SO4) and Sulfide (as S)



## DATA QUALIFIERS

The data validation review has identified aspects of the analytical data that require qualification. To confidently use any of the data within the data set, the data user should understand the limitations and qualifications presented. With regard to data usability, the following qualifiers are offered based upon the data provided.

### ORGANIC QUALIFIERS

#### General Comments:

- The laboratory could not locate the analytical results for sample G317 (LL 350319) therefore, this sample is not included on the summary tables. Comments are offered within the narrative report regarding data usability associated with this sample.
- In the analysis of PCDD/PCDF, the support documentation associated with the initial calibrations, matrix spike, matrix spike duplicate, laboratory blank and blank spike were not provided for review. The quantitative results are assumed to be correct as reported and any comment regarding data bias (high or low) are offered based upon the limited data received for review.

#### Hold Times:

- Samples G120S-Dup (LL 350319) was analyzed for P/T volatile compounds 2 days outside the hold time requirement. There is no impact on data usability and no qualifiers have been applied.

#### Blank Contamination:

- Due to the trace presence of the following HP/T volatile and P/T volatile organic compounds in the associated laboratory and/or field blank samples, positive results of these compounds in the field samples are qualitatively questionable and have been flagged (B) on Table 2. Reported concentrations which are greater than 5 times the blank concentration (10 times for methylene chloride) are regarded as "real" values and no qualifier is applied. The following samples were qualified:

<u>Analyte</u>	<u>Log Link</u>	<u>Associated Samples</u>
Methylene chloride & Acetone	350304	All field samples
	350305	All field samples
	350306	All field samples
	350307	All field samples

<u>Analyte</u>	<u>Log Link</u>	<u>Associated Samples</u>
Methylene chloride & Acetone	350308	All field samples
	350309	All field samples
	350317	All field samples
	350319	All field samples

- Due to the trace presence of the following semi-volatile organic compounds (VOAs) in the associated laboratory and/or field blank samples, positive results for these compounds in the field samples are qualitatively questionable and have been flagged (B) on Table 2. Positive concentrations which are greater than five times the blank concentrations (ten times for phthalates) are regarded as "real" values and no qualifier is applied. The following samples were flagged (B):

<u>Analyte</u>	<u>Log Link</u>	<u>Associated Samples</u>
Di-n-butyl phthalate	350317	G303
bis(2-ethylhexyl) phthalate	350317	G303

#### Surrogate Recoveries:

- All volatile surrogate compound recoveries fell within acceptable control limits.
- The base/neutral semi-volatile surrogate compound, 2-fluorobiphenyl associated with sample G342 (LL 350307), fell outside control limits (low). No qualifier is required since only one surrogate per fraction fell outside control limits.
- The base/neutral semi-volatile surrogate compound, terphenyl-d14, associated with sample G336 (LL 350304) and nitrobenzene-d5 for sample G302 (LL 350319), fell outside control limits (high). No qualifier is required since only one surrogate per fraction fell outside control limits.
- The base/neutral semi-volatile surrogate compounds, nitrobenzene-d5 and terphenyl-d14, associated with samples G332 and G324 (LL 350309), fell outside control limits (low). Positive base/neutral results may be biased low and have been flagged (J). The non-detected results may be higher than reported and have been flagged (UJ) on Table 2.
- The acid semi-volatile surrogate compound, phenol-d5, fell outside control limits (high) for samples G348-Dup, G330 (LL 350307), G324 and 02FB (LL 350309). No qualifier is required since only one surrogate per fraction fell outside control limits.

- The acid semi-volatile surrogate compound, 2-fluorophenol, fell outside control limits (high) for sample G342 (LL 350307). No qualifier is required since only one surrogate per fraction fell outside control limits.
- Two acid-extractable semi-volatile surrogate compounds, phenol-d5 and 2-fluorophenol, fell outside control limits (low) for samples G348 (LL 350307) and G120S (LL 350308). Since the recovery of 2-fluorophenol was extremely low (less than 10%), the positive acid extractable result may be biased low and have been flagged (J) on Table 2. The non-detected results are regarded as unreliable and have been flagged (R) on the summary tables.
- No pesticide/PCB analyses required qualification based upon surrogate recoveries.

#### Initial and Continuing Calibration Results:

- The base/neutral/acid extractable support documentation for all samples in Log Link 350306, 350307 and 350319 could not be located in hardcopy or magnetic tape by the laboratory. The results for the aforementioned samples are assumed to be correct as reported by the laboratory and any data biases (high or low) were noted based upon an evaluation of the limited data provided.
- Due to the high difference between the initial and continuing calibration response factors (%D >35% and <90%), all positive results for the following HP/T volatile compounds have been flagged (J) estimated. The actual detection limit may be higher than reported and has been flagged (UJ) estimated in Table 2 of this report.

<u>Analyte</u>	<u>Log Link</u>	<u>Associated Samples</u>
Ethyl cyanide, 1,4-Dioxane, & Isobutyl alcohol	350306	All field samples
	350307	All field samples
Methacrylonitrile	350317	G303
	350319	G318, G337
Acetonitrile	350306	All field samples
	350307	All field samples
	350319	G318, G337
Acrolein	350306	All field samples
	350307	All field samples
	350317	G303
	350319	All field samples

<u>Analyte</u>	<u>Log Link</u>	<u>Associated Samples</u>
Acrylonitrile	350306	All field samples
	350307	All field samples
	350317	G303
	350319	G318, G337

- Due to the extremely high percent difference between the initial and continuing calibration response factors (%D > 90%), positive result for the following HP/T volatile compound have been flagged (J) estimated. The non-detected values are unreliable and have been flagged (R) on Table 2.

<u>Analyte</u>	<u>Log Link</u>	<u>Associated Samples</u>
Acrylonitrile	350304	All field samples
	350305	All field samples

- Due to the high difference between the initial and continuing calibration response factors (%D > 35% and < 90%), all positive results for the following volatile compounds have been flagged (J) estimated. The actual detection limit may be higher than reported and has been flagged (UJ) estimated in Table 2 of this report.

<u>Analyte</u>	<u>Log Link</u>	<u>Associated Samples</u>
Methylene chloride, Carbon disulfide & trans-1,2-Dichloropropene	350304	All field samples
	350305	All field samples
	350306	G343, G307, 01FB, G334
	350307	G348, G348-Dup, G330, G330-Dup, G342
Dichlorobromomethane	350307	G348, G348-Dup
Methyl chloride	350304	G344
	350305	G308
	350307	G330, G330-Dup, G342
Carbon disulfide	350308	G123S, G120S, 01TB
	350309	G124S, 06FB, 02FB, G332, 02TB
	350317	G303
	350319	G121S, G318, G337
Acetone	350309	G332
Methyl bromide	350309	G332
	350319	G302, G302-Dup, G305, G317, G303, G121S
Trichlorofluoromethane	350319	G302, G302-Dup, G305, G317, G303, G121S

- Due to the high difference between the initial and continuing calibration response factors (%D >35% and <90%), positive results for the following semi-volatile compounds have been flagged (J) estimated on Table 2.

<u>Analyte</u>	<u>Log Link</u>	<u>Associated Sample</u>
2,6-Dichlorophenol & Diphenylamine	350304	G314, G336, G308
	350305	G347, G344
	350317	G303
4-Aminobiphenyl	350309	06FB
3,3-Dimethylbenzidine	350304	G314, G336, G308
	350305	G347, G344
	350317	G303
	350319	All field samples

- Due to the extremely high percent difference between the initial and continuing calibration response factors (%D >90%), positive result for the following HP/T volatile compound have been flagged (J) estimated. The non-detected values are unreliable and have been flagged (R) on Table 2.

<u>Analyte</u>	<u>Log Link</u>	<u>Associated Sample</u>
4-Aminobiphenyl	350304	G314, G336, G308
	350305	G347, G344

- For the pesticide, PCB and herbicide analyses, the correlation coefficient for the initial calibrations fell within acceptable control limits (>0.995) for all samples.
- For the pesticide/PCB analyses, the analytical sequence requirements were met. However, since the standard chromatograms were not available for review (quantitation reports only), no comments can be offered regarding an evaluation of the system performance with regards to adequate peak resolution.
- Due to the high difference between the initial and continuing calibration response factors, positive results for the pesticide compound Phorate, associated with the analysis of samples G348 and G348-Dup (LL 350307) are quantitatively questionable and have been flagged (J) estimated on Table 2.

- The DDT/Endrin percent breakdown associated with LL 350304, 350305, 350306, 350307, 350308, 350309 and 350319 could not be evaluated since the DDT/Endrin degradation check sample was not provided for review.
- The DDT/Endrin percent breakdown associated with LL 350317 was outside control limits (greater than 30%). However, there is no impact on data usability since the field samples were non-detected for DDT, Endrin or their breakdown products.
- Due to the high difference between the initial and continuing calibration response factors, the positive results for the herbicide compound, 2,4,5-T in sample G123S (LL 350307) is regarded as an estimated value and has been flagged UJ) on Table 2.
- The initial 5-point calibration for PCDD and PCDF was not provided for review. A daily standard which contained target compounds and internal standards was associated with each field sample analysis. The correct ions were used to calculate the relative response factors (RRF) and compound ion ratios fell within method-defined limits.

#### Internal Standard Area Performance:

- The area count of the HP/T volatile internal standard, acetone-C13, associated with samples 06FB (LL 350309) G302 and G318 (LL 350319) fell outside the control limits (low). The positive and non-detected compounds quantitated against this internal standard for these samples may be biased low and have been flagged (J/UJ) estimated on Table 2.
- All three volatile internal standards fell outside (low) control limits for samples G121S and G302 (LL 350319). The positive and non-detected compounds quantitated against this internal standard for these samples may be biased low and have been flagged (J/UJ) estimated on Table 2.
- The semi-volatile internal standards, chrysene-d12 and perylene-d12, fell outside (low) control limits for sample G344 (LL 350305). The positive and non-detected compounds quantitated against this internal standard for these samples may be biased low and have been flagged (J/UJ) estimated on Table 2.

#### Matrix Spikes (MS) and Matrix Spike Duplicate (MSD) Results:

- The reported recovery of acrolein in the HP/T volatile analyses could not be confirmed since this compound was not reported on the quantitation reports generated and provided for review.

- The field-duplicate pair G348/G348-Dup and G302/G302-Dup were collected and submitted to the laboratory. Overall, the reproducibility of the organic analyses was good, providing a positive indication of both laboratory and field precision. The HP/T compound 1,4-dioxane, was detected in sample G348-Dup and was not-detected in sample G348 while acrylonitrile was reported at 25.2 ug/L in sample G302-Dup and non-detected in G302. The positive and non-detected results for these compounds are regarded as estimated values and have been flagged (J/UJ) on Table 2.
- The field-duplicate pair G330 and G330-Dup were collected and submitted to the laboratory. Overall, the reproducibility of the organic analyses was good with the exception of acrolein and isobutyl alcohol in the HP/T volatile fraction and vinyl chloride in the P/T volatile analyses. Positive and non-detected results of these compounds are regarded as estimated values and have been flagged (J/UJ) on Table 2.
- In the MS/MSD analysis of sample G302 (LL 350319), a high relative percent difference was obtained for the semi-volatile compounds. The reported concentrations in the MSD were approximately twice as high as the MS concentrations. The positive results reported in the unspiked sample are regarded as estimated values and have been flagged (J) on Table 2.
- In the semi-volatile analysis of sample G314 (LL 350304), G343 (LL 350306) and G303 (LL 350317), matrix spike recoveries as well as the blank spike recoveries were less than 10 percent for the base/neutral compounds, diethyl phthalate, dimethyl phthalate and hexachlorophene. Positive results in the unspiked samples may be biased low and have been flagged (J) on Table 2. Non-detected results in all field samples in LL 350304, 350305, 350306, 350307 and 350317 are unreliable (compound may or may not be present) and have been flagged (R).
- The field-duplicate pair G320 and G320-Dup were collected and submitted to the laboratory. Overall, the reproducibility of the organic analyses was good with the exception of the semi-volatile fraction analyses. Several compounds were detected in G120S-Dup which were reported as non-detected in G120S. The lack of reproducibility may be due to a lack of sample homogeneity. Positive and non-detected results of these compounds are regarded as estimated values and have been flagged (J/UJ) on Table 2.
- A high percent recovery was obtained for the pesticide, famphur in both the blank spike and matrix spike analysis of MS sample G343 (LL 350306)

and 350307). There is no impact on data usability and no qualifier is required since the field samples were all non-detected for Famphur.

- The polychlorinated dibenzo-p-dioxin/dibenzofuran matrix spike recovery of PCDD was outside control limits for both the blank spike and matrix spikes associated with all samples in LL 350306, 350307, 350308 and 350309. Positive PCDD results may be biased high; however, no qualifier is required since all associated samples were not detected for this cogener.
- The polychlorinated dibenzo-p-dioxin/dibenzofuran matrix spike recovery of PCDD was outside control limits for the matrix spike associated with all samples in LL 350319. Non of the spiked compounds were recovered (0%) in the blank spike associated with these sample. The non-detected results are unreliable (compound may or may not be present) and have been flagged (R) on Table 2.

**Additional Comments:**

- As per the requirements, all values calculated below the method detection limit should be considered estimated and have been flagged (J) in Table 2 of this report.

**INORGANIC and CONVENTIONAL PARAMETER QUALIFIERS**

**General Comments:**

- With the exception of the sample preparation log, no support documentation was received for review for the conventional parameters associated with ETC Log Links 350304 through 350319. Therefore, no comments are offered regarding the qualitative or quantitative validity of the reported results in the aforementioned data set.
- In the metals fraction, this reviewer has observed that for the ICP concentrations reported at 10 to 15 times above the method detection limit (MDL), the data validation cannot reproduce the laboratory reported results. The calculation obtained during data validation is consistently higher than the laboratory reported concentration. This is due to the fact that the interelement correction factors in the ICP instrument have been externally calculated. Since this external interelement correction factor is not available for review, the reported results for low level samples cannot be reproduced. It should be noted that positive ICP reported results that are significantly above than the MDL were reproduced and validated, since this interelement correction factor becomes negligible at higher



concentrations. The data review assumes that the low level reported concentrations are correct as reported and it is this reviewer's opinion that data usability is not impacted.

#### Hold Times:

- All samples were digested and analyzed within the required hold time criteria for metals, cyanide and chloride. The preparation and analysis date of the sulfate and sulfide parameters were not available for review; therefore, no comments can be offered regarding the hold time compliance for sulfate or sulfide.

#### Blank Contamination:

- Trace concentrations of metals were detected in the laboratory and/or field-blank sample at concentrations below the reported method detection limit (BMDL). The positive results of these analytes in the field samples reported as BMDL are qualitatively questionable and have been flagged (B) on Table 2. The positive results reported at or above the method detection limits are regarded as "real" values and no qualifier has been applied. The following samples have been flagged (B) on the summary table:

<u>Analyte</u>	<u>ETC Log Link</u>	<u>Associated Samples</u>
Arsenic	350306	G343
Zinc	350307	G330, G330-Dup
	350308	G123S, G120S, DUP
	350309	G124S

- Trace concentrations of chromium were identified in the laboratory blank associated with LL 350317 and 350319 at concentrations below the reported method detection limit (BMDL). No qualifier has been applied since the concentrations of chromium in the field samples are above the method detection limit and are regarded as "real" values.

#### Inductively Coupled Plasma (ICP) Serial Dilution Results:

- The percent difference of the ICP serial dilution analyses of calcium, iron and magnesium for sample G123S (LL 350308) were outside control limits (>10%). The positive results for these compounds in sample G123S are regarded as estimated and has been flagged (J) on Table 2.

- The percent difference of the ICP serial dilution analyses of beryllium, cadmium, chromium, magnesium, nickel, lead, vanadium and zinc for sample G302 (LL 350319) were outside control limits (>10%). The positive results in sample G302 are regarded as estimated and has been flagged (J) on Table 2.

#### Matrix Spike (MS) and Duplicate (DU) Summary Results:

- Due to the low blank spike recoveries of cadmium and silver associated with LL 350304, 350305 and 350306, the positive and non-detected results in all field samples are regarded as estimated (biased low) and have been flagged (J/UJ) on Table 2.
- Due to the low matrix spike recoveries of cadmium, chromium, nickel, mercury, tin and thallium in MS sample G123S (LL 350308), the positive and non-detected results in the unspiked sample G123S are regarded as estimated (biased low) and have been flagged (J/UJ) on Table 2.
- The matrix spike recovery of arsenic in sample G344 (LL 350304) was outside (high) control limits. The positive arsenic result in G344 may be biased high and has been flagged (J) on Table 2.
- The matrix spike recoveries for selenium and thallium in MS sample G344 (LL 350304) were outside (low) control limits. The positive and non-detected selenium and thallium results in the unspiked field sample may be biased low and have been flagged (J/UJ) on Table 2.
- Due to the low matrix spike recoveries of beryllium, arsenic, calcium, cadmium, cobalt, chromium, copper, nickel, lead, antimony, tin, zinc, selenium and thallium in MS sample G302 (LL 350319), the positive and non-detected results in the unspiked sample are regarded as estimated (biased low) and have been flagged (J/UJ) on Table 2.
- The blank spike recovery of silver associated with all field samples in LL 350307, 350308, 350309, 350317 and 350319 fell outside (low) control limits. The positive and non-detected silver results in the associated field samples may be biased low and have been flagged (J/UJ) on Table 2.
- The matrix spike recoveries of calcium, iron, potassium, magnesium, sodium and strontium in MS sample G123S (LL 350308) was outside control limits (low). No qualifier has been applied since the analyte concentration in the unspiked sample is greater than four times the blank concentration.

- Field duplicate samples G348-Dup, G330-Dup and G120S-Dup were collected and submitted as duplicates of G348, G330 (LL 350307) and G120S (LL 350308). Overall, the reproducibility of the metals and conventional parameters is good, providing a positive indication of the field and laboratory precision.

#### Post-Digestion Spike Recoveries:

- The post-digestion spike recoveries of the following analytes were outside the control limits (low). Positive and/or non-detected results of these analytes for the associated samples may be biased low and have been flagged (J/UJ) estimated.

<u>Analyte</u>	<u>Log Link</u>	<u>Associated Samples</u>
Selenium	350306	G334, G307, G349, 01FB
	350307	G348-Dup, G348, G342
	350308	G123S, G120S, G120S-Dup
	350309	G332, G324, G124S, 06FB
	350317	G303
	350319	G121S, G305, G318, G337, G302
Thallium	350305	G344
	350306	G334, G307, G349
	350307	G348, G330, G330-Dup
	350308	G120S, G120S-Dup
	350309	G332, G324, G124S
	350317	G303
	350319	G121S, G302-Dup, G317, G305, G318
Arsenic	350319	G121S
Lead	350306	01FB
	350319	G121S

#### Additional Comments:

- The laboratory reports several inorganic results as below the method detection limit (BMDL). These are reported as BMDL on Table 2. The actual concentrations are not calculated during the data validation review since the interelement coefficient factors were not provided.

TABLE 2  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number		G314	G336	G308	G347	G344	G343	G334	G307	G349	01FB
Laboratory Sample Number		HA1816	HA1820	HA1823	HA1817	HA1822	HA1818	HA1819	HA1821	HA1824	HA1838
Sampling Date	Quant	11/16/89	11/16/89	11/16/89	11/17/89	11/17/89	11/20/89	11/20/89	11/20/89	11/20/89	11/20/89
Dilution Factor	Limit	100	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
APPENDIX IX HEATED P/T VOLATILE COMPOUNDS											
Acetonitrile	15	3210	U	17.7	8.97	13.4	UJ	UJ	UJ	UJ	UJ
Acrolein	20	U	U	U	U	U	UJ	UJ	UJ	UJ	UJ
Acrylonitrile	10	R	R	R	R	R	UJ	UJ	UJ	UJ	UJ
1,4-Dioxane	300	U	U	39.3	82.7	U	UJ	UJ	142 J	UJ	UJ
Ethyl cyanide	40	U	U	U	14.1	U	UJ	UJ	UJ	UJ	UJ
Isobutyl alcohol	230	U	U	U	21.2	U	UJ	UJ	UJ	UJ	UJ
Methacrylonitrile	110	U	U	U	4.5 J	U	U	U	U	U	U

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TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number		G314	G336	G308	G347	G344	G343	G334	G307	G340	01FB
Laboratory Sample Number		HA1816	HA1820	HA1823	HA1817	HA1822	HA1818	HA1819	HA1821	HA1824	HA1838
Sampling Date		11/16/89	11/16/89	11/16/89	11/17/89	11/17/89	11/20/89	11/20/89	11/20/89	11/20/89	11/20/89
Dilution Factor		100	1.0	1.0	1.0	1.0/20	1.0	1.0	1.0	5.0	1.0
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
APPENDIX IX P/T VOLATILE COMPOUNDS											
Benzene	4.4	598	U	11.9	U	1212 *	U	U	U	41.3	U
Methyl bromide	4.7	U	U	U	U	U	U	U	U	U	U
Carbon disulfide	10	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	U	UJ
Chloroethane	6.0	U	U	U	U	U	U	U	U	U	U
Chlorobenzene	-	U	12.4	U	U	U	U	U	U	16.3 J	U
2-Chloro-1,3-butadiene	3.1	U	U	U	U	U	U	U	U	U	U
Chloroform	10	U	U	U	U	U	U	U	U	U	U
Methyl chloride	1.6	U	U	UJ	U	UJ	U	U	U	U	U
3-Chloropropene	10	U	U	U	U	U	U	U	U	U	U
1,2-Dibromo-3-chloropropane	2.2	U	U	U	U	U	U	U	U	U	U
1,2-Dibromoethane	10	U	U	U	U	U	U	U	U	U	U
Dibromoethane	10	U	U	U	U	U	U	U	U	U	U
1,4-Dichloro-2-butene	10	U	U	U	U	U	U	U	U	U	U
Dichlorodifluoromethane	10	U	U	U	U	U	U	U	U	U	U
1,1-Dichloroethane	4.7	U	U	5.18	U	U	U	U	U	30.9	U
1,2-Dichloroethane	2.8	U	U	7.98	U	80.5	U	U	U	19.4	U
1,2-Trans-dichloroethene	1.6	U	U	U	U	U	U	U	U	15.8	U
1,1-Dichloroethene	2.8	U	U	U	U	U	U	U	U	U	U
Methylene Chloride	5.0	3340	1310 JB	18 JB	50 JB	8.14 JB	60.5 JB	6.58 JB	22.9 JB	6.06 JB	41 B
1,2-Dichloropropane	10	U	U	U	U	U	U	U	U	U	U
cis-1,3-Dichloropropene	7.2	U	U	U	U	U	U	U	U	U	U
trans-1,3-Dichloropropene	10	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	U	UJ
Chlorodibromomethane	10	U	U	U	U	U	U	U	U	U	U
Dichlorobromomethane	10	U	U	U	U	U	U	U	U	U	U
Ethyl methacrylate	10	U	U	U	U	U	U	U	U	U	U
Iodomethane	7	U	U	U	U	U	U	U	U	U	U
Methyl ethyl ketone	2.8	U	U	18.8	U	U	U	U	U	U	U
Methyl methacrylate	10	U	U	U	U	U	U	U	U	U	U
Pentachloroethane	10	U	U	U	U	U	U	U	U	U	U
1,1,2,2-Tetrachloroethane	10	U	U	U	U	U	U	U	U	U	U
1,1,2,2-Tetrachloroethane	-	U	U	U	U	U	U	U	U	U	U
Tetrachloroethene	10	U	U	U	U	U	U	U	U	128	U
Carbon tetrachloride	4.1	U	U	U	U	U	U	U	U	U	U
Toluene	4.1	U	U	4.9 J	U	418 *	U	U	U	353	U

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TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number Laboratory Sample Number Sampling Date Dilution Factor Units	Quant Limit ug/L	G314 HA1816 11/16/89 100 ug/L	G338 HA1820 11/16/89 1.0 ug/L	G308 HA1823 11/16/89 1.0 ug/L	G347 HA1817 11/17/89 1.0 ug/L	G344 HA1822 11/17/89 1.0/20 ug/L	G343 HA1818 11/20/89 1.0 ug/L	G334 HA1819 11/20/89 1.0 ug/L	G307 HA1821 11/20/89 1.0 ug/L	G349 HA1824 11/20/89 5.0 ug/L	01FB HA1838 11/20/89 1.0 ug/L
APPENDIX IX P/T VOLATILE COMPOUNDS (continued)											
Bromoform	6.0	U	U	U	U	U	U	U	U	U	U
1,1,1-Trichloroethane	1.6	U	U	U	U	U	U	U	U	U	U
1,1,2-Trichloroethane	3.8	U	U	U	U	U	U	U	U	U	U
Trichloroethene	5.0	U	U	U	U	U	U	U	U	17.9	U
Trichlorofluoromethane	10	U	U	U	U	U	U	U	U	U	U
1,2,3-Trichloropropane	1.9	U	U	U	U	U	U	U	U	U	U
Vinyl Chloride	10	14500	U	27.8	U	U	U	U	U	U	U
Acetone	10	780 JB	9.7 JB	88.4 B	23.7 B	1100 B*	20.3 B	22.0 JB	11.7 B	376 B	6.1 JB
Ethylbenzene	7.2	U	U	U	U	90	U	U	U	66.5	U
2-Hexanone	10	U	U	U	U	U	U	U	U	U	U
Methyl isobutyl ketone	10	U	U	18.6	5.13 J	2310 *	U	U	U	171	U
Styrene	10	U	U	U	U	U	U	U	U	239	U
Vinyl acetate	10	U	U	U	U	U	U	U	U	U	U
m-Xylene	10	U	U	U	U	219	U	U	U	205	U
o,p-Xylenes	10	U	U	U	U	179	U	U	U	186	U

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TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number		G314	G336	G308	G347	G344	G343	G334	G307	G346	01FB
Laboratory Sample Number		HA1816	HA1820	HA1823	HA1817	HA1822	HA1818	HA1819	HA1821	HA1824	HA1838
Sampling Date	Quant	11/16/89	11/16/89	11/16/89	11/17/89	11/17/89	11/20/89	11/20/89	11/20/89	11/20/89	11/20/89
Dilution Factor	Limit	1.0	1.0	1.0	1.0	1.0/20	1.0	1.0	1.0	1.0	1.0
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
APPENDIX IX SEMIVOLATILE COMPOUNDS											
Acetophenone	17	1.7 J	U	U	U	11.5	U	U	U	2.6 J	U
2-Acetylaminofluorene	17	U	U	U	U	UJ	U	U	U	U	U
4-Aminobiophenyl	17	R	R	R	R	R	U	U	U	U	U
Aniline	17	U	U	6.6 J	U	1070 J*	U	U	U	U	U
Aramite	17	U	U	U	U	U	U	U	U	U	U
Benzo(A)anthracene	13	U	U	1.6 J	U	UJ	U	U	U	U	U
Benzo(b)fluoranthene	8.0	U	U	1.4 J	U	UJ	U	U	U	U	U
Benzo(a)pyrene	4.2	U	U	U	U	U	U	U	U	U	U
Bis(2-Chloroethoxy)methane	8.8	U	U	U	U	U	U	U	U	U	U
Bis(2-chloroethyl) ether	9.5	U	U	U	U	U	U	U	U	U	U
Bis(2-chloroisopropyl) ether	9.5	U	U	U	U	U	U	U	U	U	U
Bis(2-Ethylhexyl)phthalate	17	9.3 J	12.4	U	12.7	11.5 J	U	U	U	U	U
4-Bromophenylphenyl ether	3.2	U	U	U	U	U	U	U	U	U	U
Butylbenzylphthalate	17	U	U	U	U	UJ	U	U	U	U	U
2-sec-Butyl-4,6-dinitrophen	17	U	U	U	U	U	U	U	U	U	U
p-Chloroaniline	17	U	0.64 J	24.8	U	5570 *	U	U	U	U	U
p-Chloro-m-cresol	5.0	U	U	U	U	U	U	U	U	U	U
2-Chloronaphthalene	3.2	U	U	U	U	U	U	U	U	U	U
2-Chlorophenol	5.5	U	0.64 J	50.4	U	989	U	U	U	30.2	U
Chrysene	4.2	U	U	U	U	UJ	U	U	U	U	U
Acenaphthene	3.2	0.88 J	1.7 J	8.37	U	3.51	U	U	U	U	U
Acenaphthylene	5.8	U	U	U	U	U	U	U	U	U	U
Anthracene	3.2	U	U	2.26	U	U	U	U	U	U	U
Benzo(ghi)perylene	6.8	U	U	U	U	UJ	U	U	U	U	U
Benzo(k)fluoranthene	4.2	U	U	U	U	UJ	U	U	U	U	U
Fluorene	3.2	U	0.48 J	4.57	U	2.47	U	U	U	U	U
Phenanthrene	9.0	0.68 J	0.43 J	12.8	U	1.59 J	U	U	U	U	U
Pyrene	3.2	U	U	4.46	U	U	U	U	U	U	U
2-Nitrophenol	6.0	U	U	U	U	U	U	U	U	U	U
o-Cresol	17	U	U	11.8	U	86.4	U	U	U	13.1	U
m+p-Cresols	17	243	U	188	U	514 *	U	U	U	42.8	U
Diallate	17	U	U	U	U	U	U	U	U	U	U
Dibenzo(a,h)anthracene	4.2	U	U	U	U	UJ	U	U	U	U	U
Di-n-butyl phthalate	17	U	0.34 J	0.33 J	0.54 J	U	U	U	0.39 J	0.74 J	U
1,2-Dichlorobenzene	3.2	U	U	U	U	U	U	U	U	U	U
1,3-Dichlorobenzene	3.2	U	U	U	U	U	U	U	U	U	U
1,4-Dichlorobenzene	7.3	U	U	U	U	U	U	U	U	U	U
3,3-Dichlorobenzidine	27.5	U	U	U	U	U	U	U	U	U	U
2,4-Dichlorophenol	4.5	35.7	U	283	U	1310 *	U	U	4.56	94.4	U
2,6-Dichlorophenol	17	UJ	UJ	14.4 J	UJ	134 J	U	U	U	13.4	U

continued next page (see last page of table for notes)

**TABLE 2 (continued)**  
**SUMMARY OF ANALYTICAL RESULTS**  
**PHASE I INVESTIGATION**  
**CHEMICAL WASTE MANAGEMENT**  
**CHICAGO, ILLINOIS**

Dames and Moore Sample Number		G314	G336	G308	G347	G344	G343	G334	G307	G349	01FB
Laboratory Sample Number		HA1816	HA1820	HA1823	HA1817	HA1822	HA1818	HA1819	HA1821	HA1824	HA1838
Sampling Date	Quant	11/16/89	11/16/89	11/16/89	11/17/89	11/17/89	11/20/89	11/20/89	11/20/89	11/20/89	11/20/89
Dilution Factor	Limit	1.0	1.0	1.0	1.0	1.0/20	1.0	1.0	1.0	1.0	1.0
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
<b>APPENDIX IX SEMIVOLATILE COMPOUNDS (continued)</b>											
Diethylphthalate	17	R	R	R	R	R	R	R	R	R	R
p-Dimethylaminoazobenzene	17	U	U	U	U	UJ	U	U	U	U	U
7,12-Dimethylbenzo(a)anthra	17	U	U	U	U	UJ	U	U	U	U	U
3,3-Dimethylbenzidine	17	UJ	UJ	UJ	UJ	UJ	U	U	U	U	U
a-a-Dimethylphenethylamine	-	U	U	U	U	U	U	U	U	U	U
2,4-Dimethylphenol	4.5	3.28	U	21.9	U	31.6	U	U	U	3.75	U
Dimethyl phthalate	17	R	R	R	R	R	R	R	R	R	R
m-Dinitrobenzene	17	U	U	U	U	U	U	U	U	U	U
4,6-Dinitro-0-cresol	40	U	U	U	U	U	U	U	U	U	U
2,4-Dinitrophenol	70	U	U	U	U	U	U	U	U	U	U
2,4-Dinitrotoluene	9.5	U	U	U	U	U	U	U	U	U	U
2,6-Dinitrotoluene	3.2	U	U	U	U	U	U	U	U	U	U
Di-n-octyl phthalate	17	U	U	0.64	U	UJ	U	U	U	U	U
Diphenylamine	17	UJ	UJ	UJ	UJ	UJ	U	U	U	U	U
N-nitrosodipropylamine	17	U	U	U	U	U	U	U	U	U	U
Ethyl methanesulfonate	17	U	U	U	U	U	U	U	U	U	U
Fluoranthene	3.7	U	U	5.66	U	U	U	U	U	U	U
Hexachlorobenzene	3.2	U	U	U	U	U	U	U	U	U	U
Hexachlorobutadiene	1.5	U	U	U	U	U	U	U	U	U	U
Hexachlorocyclopentadiene	17	U	U	U	U	U	U	U	U	U	U
Hexachloroethane	2.7	U	U	U	U	U	U	U	U	U	U
Isodrin	9.8	U	U	U	U	U	U	U	U	U	U
Hexachlorophene	17	R	R	R	R	R	R	R	R	R	R
Hexachloropropene	17	U	U	U	U	U	U	U	U	U	U
Indeno(1,2,3-c,d)pyrene	6.2	U	U	U	U	UJ	U	U	U	U	U
Isosafrole	17	U	U	U	U	U	U	U	U	U	U
Methapyrilene	-	U	U	U	U	U	U	U	U	U	U
3-Methylcholanthrene	9.2	U	U	U	U	UJ	U	U	U	U	U
Methyl methanesulfonate	17	U	U	U	U	U	U	U	U	U	U
Naphthalene	2.7	2.61	0.52 J	31.8	U	98.7	U	U	U	7.81	U
1,4-Naphthoquinone	17	U	U	U	U	U	U	U	U	U	U
1-Naphthylamine	17	U	U	U	U	U	U	U	U	U	U
2-Naphthylamine	17	U	U	U	U	U	U	U	U	U	U
p-Nitroaniline	17	U	U	U	U	U	U	U	U	U	U
Nitrobenzene	3.2	U	U	U	U	U	U	U	U	U	U
4-Nitrophenol	4.0	U	U	U	U	U	U	U	U	U	U
4-Nitroquinoline-N-oxide	-	U	U	U	U	U	U	U	U	U	U
N-Nitrosodiphenylamine	3.2	U	U	U	U	U	U	U	U	U	U
N-Nitrosodi-n-butylamine	17	U	U	U	U	U	U	U	U	U	U
N-Nitrosodiethylamine	1	U	U	U	U	U	U	U	U	U	U
N-Nitrosodimethylamine	17	U	U	U	U	U	U	U	U	U	U
N-Nitrosomethylethylamine	17	U	U	U	U	U	U	U	U	U	U

continued next page (see last page of table for notes)



TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number		G314	G336	G308	G347	G344	G343	G334	G307	G349	01FB
Laboratory Sample Number		HA1816	HA1820	HA1823	HA1817	HA1822	HA1818	HA1819	HA1821	HA1824	HA1838
Sampling Date	Quant	11/16/89	11/16/89	11/16/89	11/17/89	11/17/89	11/20/89	11/20/89	11/20/89	11/20/89	11/20/89
Dilution Factor	Limit	1.0	1.0	1.0	1.0	1.0/20	1.0	1.0	1.0	1.0	1.0
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
APPENDIX IX SEMIVOLATILE COMPOUNDS (continued)											
N-Nitrosomorpholine	17	U	U	U	U	U	U	U	U	U	U
N-Nitrosopiperidine	17	U	U	U	U	U	U	U	U	U	U
N-Nitrosopyrrolidine	17	U	U	U	U	U	U	U	U	U	U
5-Nitro-o-toluidine	17	U	U	U	U	U	U	U	U	U	U
Pentachlorobenzene	17	U	U	U	U	U	U	U	U	U	U
Pentachloronitrobenzene	17	U	U	U	U	U	U	U	U	U	U
Pentachlorophenol	6.0	U	U	U	U	13.3	U	U	U	U	U
Phenacetin	17	U	U	U	U	U	U	U	U	U	U
Phenol	2.5	403	U	236	U	4290 *	U	U	U	350	U
m-phenylenediamine	17	U	U	U	U	U	U	U	U	U	U
o-phenylenediamine	17	U	U	U	U	U	U	U	U	U	U
p-phenylenediamine	17	U	U	U	U	U	U	U	U	U	U
2-Picoline	17	U	U	U	U	3.4 J	U	U	U	U	U
Pronamide	17	U	U	U	U	U	U	U	U	U	U
Pyridine	17	28.3 J	U	0.72 J	U	7.1 J	U	U	U	U	U
Safrole	17	U	U	U	U	U	U	U	U	U	U
1,2,4,5-Tetrachlorobenzene	17	U	U	U	U	U	U	U	U	U	U
2,3,4,6-Tetrachlorophenol	17	U	U	U	U	4.6 J	U	U	U	U	U
Tetraethyldithiopyrophospha	-	U	U	U	U	U	U	U	U	U	U
o-Toluidine	17	U	U	U	U	232	U	U	U	U	U
1,2,4-Trichlorobenzene	3.2	U	U	U	U	U	U	U	U	U	U
2,4,5-Trichlorophenol	17	U	U	U	U	29	U	U	U	U	U
2,4,6-Trichlorophenol	4.5	U	U	2.71 J	U	3.6 J	U	U	U	3.79	U
0,0,0-Triethyl phosphorothi	-	U	U	U	U	U	U	U	U	U	U
sym-Trinitrobenzene	-	U	U	U	U	U	U	U	U	U	U
Benzyl alcohol	17	U	U	1.23 J	U	U	U	U	U	U	U
Dibenzofuran	17	U	U	3.5 J	U	2.28 J	U	U	U	U	U
Isophorone	3.7	U	U	U	U	U	U	U	U	0.49 J	U
2-Methylnaphthalene	17	U	U	U	U	U	U	U	U	U	U
o-Nitroaniline	17	U	U	U	U	U	U	U	U	U	U
m-Nitroaniline	17	U	U	U	U	U	U	U	U	U	U
4-Chlorophenyl phenyl ether	7.0	U	U	U	U	U	U	U	U	U	U

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number	G314	G336	G308	G347	G344	G343	G334	G307	G349	01FB
Laboratory Sample Number	HA1816	HA1820	HA1823	HA1817	HA1822	HA1818	HA1819	HA1821	HA1824	HA1838
Sampling Date	11/16/89	11/16/89	11/16/89	11/17/89	11/17/89	11/20/89	11/20/89	11/20/89	11/20/89	11/20/89
Units	ng/L (ppt)	ng/L (ppt)	ng/L (ppt)	ng/L (ppt)	ng/L (ppt)	ng/L (ppt)	ng/L (ppt)	ng/L (ppt)	ng/L (ppt)	ng/L (ppt)
PCDD/PCDF										
2,3,7,8-TCDD	2.7 U	1.2 U	2.1 U	2.2 U	1.5 U	0.58 U	0.75 U	0.81 U	0.66 U	0.65 U
TCDD	4.4 U	1.6 U	3.5 U	2.5 U	2.5 U	0.85 U	0.75 U	1.36 U	1.37 U	0.84 U
PCDD	5 U	6.4 U	6.3 U	4.1 U	5.4 U	3.09 U	3.16 U	4.07 U	3.63 U	3.19 U
HxCDD	26 U	2.8 U	5 U	3.6 U	2.2 U	0.2 U	0.26 U	0.51 U	0.34 U	0.29 U
2,3,7,8-TCDF	1.8 U	0.83 U	1.3 U	0.9 U	1.3 U	0.2 U	0.31 U	0.57 U	0.18 U	0.21 U
TCDF	2.1 U	0.85 U	1.8 U	1.1 U	1.4 U	0.24 U	0.31 U	0.57 U	0.31 U	0.23 U
PCDF	4.2 U	1.4 U	4.5 U	2.0 U	3.1 U	1.08 U	0.56 U	0.96 U	0.57 U	0.43 U
HxCDF	16 U	1.30 U	3.00 U	1.8 U	1.3 U	0.68 U	0.46 U	1.13 U	0.44 U	0.67 U

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number		G314	G336	G308	G347	G344	G343	G334	G307	G349	01FB
Laboratory Sample Number		HA1816	HA1820	HA1823	HA1817	HA1822	HA1818	HA1819	HA1821	HA1824	HA1838
Sampling Date	Quant	11/16/89	11/16/89	11/16/89	11/17/89	11/17/89	11/20/89	11/20/89	11/20/89	11/20/89	11/20/89
Dilution Factor	Limit	1.0	1.0	10.0	1.0	10.0	1.0	1.0	1.0	1.0	1.0
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
APPENDIX IX PESTICIDE & HERBICIDE COMPOUNDS											
Alpha-BHC	0.05	U	U	U	U	U	U	U	U	U	U
Chlordane	1.0	U	U	U	U	U	U	U	U	U	U
Chlorobenzilate	2.5	U	U	U	U	U	U	U	U	U	U
4,4'-DDD	0.10	U	U	U	U	U	U	U	U	U	U
4,4'-DDE	0.10	U	U	U	U	U	U	U	U	U	U
4,4'-DDT	0.10	U	U	U	U	U	U	U	U	U	U
Dieldrin	0.10	U	U	U	U	U	U	U	U	U	U
Endosulfan I	0.05	U	U	U	U	U	U	U	U	U	U
Endosulfan II	0.10	U	U	U	U	U	U	U	U	U	U
Endosulfan Sulfate	0.10	U	U	U	U	U	U	U	U	U	U
Endrin	0.10	U	U	U	U	U	U	U	U	U	U
Endrin Aldehyde	0.10	U	U	U	U	U	U	U	U	U	U
Hepatchlor	0.05	U	U	U	U	U	U	U	U	U	U
Hepatchlor Epoxide	0.05	U	U	U	U	U	U	U	U	U	U
Beta-BHC	0.05	U	U	U	U	U	U	U	U	U	U
Delta-BHC	0.05	U	U	U	U	U	U	U	U	U	U
Gamma-BHC (Lindane)	0.05	U	U	U	U	U	U	U	U	U	U
Kepone	0.55	U	U	U	U	U	U	U	U	U	U
Methoxychlor	0.55	U	U	U	U	U	U	U	U	U	U
Toxaphene	2.0	U	U	U	U	U	U	U	U	U	U
Arochlor-1016	0.50	U	U	U	U	U	U	U	U	U	U
Arochlor-1221	0.50	U	U	U	U	U	U	U	U	U	U
Arochlor-1232	0.50	U	U	U	U	U	U	U	U	U	U
Arochlor-1242	0.50	U	U	U	U	U	U	U	U	U	U
Arochlor-1248	0.50	U	U	U	U	U	U	U	U	U	U
Arochlor-1254	1.0	U	U	U	U	U	U	U	U	U	U
Arochlor-1260	1.0	U	U	U	U	U	U	U	U	U	U
Thionazin	1.0	U	U	U	U	U	U	U	U	U	U
Dimethoate	2.5	U	U	U	U	U	U	U	U	U	U
Disulfoton	0.55	U	U	U	U	U	U	U	U	U	U
Methyl parathion	1.0	U	U	U	U	U	U	U	U	U	U
Parathion	1.0	U	U	U	U	U	U	U	U	U	U
Phorate	2.5	U	U	U	U	U	U	U	U	U	U
Famphur	10	U	U	U	U	U	U	U	U	U	U
2,4-D	3.8	U	U	U	U	U	U	U	U	U	U
2,4,5-T	0.76	U	U	U	U	U	U	U	U	U	U
2,4,5-TP (Silvex)	0.76	U	U	U	U	U	U	U	U	U	U

continued next page (see last page of table for notes)

**TABLE 2 (continued)**  
**SUMMARY OF ANALYTICAL RESULTS**  
**PHASE I INVESTIGATION**  
**CHEMICAL WASTE MANAGEMENT**  
**CHICAGO, ILLINOIS**

Dames and Moore Sample Number Laboratory Sample Number Sampling Date Units	Quant Limit ug/L	G314 HA1816 11/16/89 ug/L	G336 HA1820 11/16/89 ug/L	G308 HA1823 11/16/89 ug/L	G347 HA1817 11/17/89 ug/L	G344 HA1822 11/17/89 ug/L	G343 HA1818 11/20/89 ug/L	G334 HA1819 11/20/89 ug/L	G307 HA1821 11/20/89 ug/L	G349 HA1824 11/20/89 ug/L	01FB HA1838 11/20/89 ug/L
<b>APPENDIX IX INORGANIC PARAMETERS</b>											
Antimony	60	U	U	U	U	U	U	U	U	U	U
Arsenic	100	150	68	170	30	130	BMDL JB	94	130	190	BMDL J
Barium	20	1400	720	1500	330	370	130	550	1000	710	U
Beryllium	1.0	11	4.9	8.9	1.9	12	BMDL J	4.4	8.5	23	U
Cadmium	3.0	35 J	38 J	56	11	18	BMDL J	27 J	60 J	56 J	U
Calcium	200	1200000	688000	911000	368000	491000	127000	1050000	1350000	524000	240
Chromium	10	180	110	220	47	190	15	98	210	380	U
Cobalt	20	81	47	110	30	31	BMDL J	65	170	69	U
Copper	10	180	520	590	86	100	22	200	350	220	U
Iron	150	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	5.0	620	1100	1900	470	180	110	590	820	270	BMDL J
Magnesium	100	218000	407000	400000	185000	34600	44000	262000	453000	58300	U
Mercury	0.20	0.52	0.7	2	U	U	BMDL J	0.79	0.43	0.2	U
Nickel	20	150	140	660	52	130	BMDL J	130	270	210	U
Potassium	500	160000	153000	119000	28000	419000	16000	128000	72900	278000	U
Selenium	5.0	9.2	5.8	BMDL J	BMDL J	19	U	BMDL J	BMDL J	29 J	UJ
Silver	10	16 J	18 J	23	BMDL J	BMDL J	UJ	17 J	32 J	BMDL J	U
Sodium	500	442000	286000	292000	117000	593000	22000	176000	169000	352000	U
Thallium	10	BMDL J	U	BMDL J	U	BMDL	U	BMDL J	BMDL J	20 J	U
Tin	50	U	BMDL J	U	U	U	U	U	U	U	U
Vanadium	20	300	190	320	89	360	27	180	340	690	U
Zinc	20	1400	1300	1900	370	1100	95	880	1200	2230	BMDL J
<b>CONVENTIONAL PARAMETERS</b>											
Chloride (mg/L)	1.0	U	U	417	2122	HA182 (CM) 11/21/89 1320	23.8	426	254	549	U
Cyanide, (total) (mg/L)	0.01	U	U	U	U	U	U	U	U	U	U
Sulfate as SO4 (mg/L)	50	U	U	185	210	835	243	1400	1130	390	U
Sulfate as S (mg/L)	0.25	U	U	17.3	0.30	18.8	U	1.6	2.3	0.4	U

**LEGEND:**

- U Compound was not detected at laboratory method detection limit.
- J Estimated value due to limitations identified during the quality assurance review.
- UJ Reported method detection limit is estimated due to limitations identified during the quality assurance review.
- B Compound was detected in a laboratory and/or field blank at similar concentrations. May represent laboratory and/or field contamination.
- R Unreliable result. Compound may or may not be present.
- \* Sample analyzed at multiple dilutions. Summary table is a hybrid of diluted and undiluted results.
- No standard available. Compound was qualitatively searched for.
- NA Not Analyzed
- NP Not Provided
- IND Indeterminate. Standard and/or spikes could not be detected at method detection limit.
- BMDL Below Method Detection Limit reported by laboratory.

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number		G348DUP	G348	G330	G330DUP	G342	G123S	G120S	G120SDUP	G124S	01TB
Laboratory Sample Number		HA1825	HA1826	HA1827	HA1829	HA1828	HA1804	HA1805	HA1806	HA1807	HA1810
Sampling Date	Quant	11/21/89	11/21/89	11/21/89	11/21/89	11/21/89	11/27/89	11/27/89	11/27/89	11/27/89	11/27/89
Dilution Factor	Limit	1.0	10.0	1.0	1.0	1.0	1.0/200	1.0	1.0	1.0	1.0
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
APPENDIX IX HEATED P/T VOLATILE COMPOUNDS											
Acetonitrile	15	410 J	362 J	UJ	UJ	UJ	18725 *	U	U	50.7	U
Acrolein	20	UJ	UJ	97.5 J	UJ	UJ	U	U	U	U	U
Acrylonitrile	10	UJ	UJ	UJ	UJ	UJ	U	U	U	U	U
1,4-Dioxane	300	507 J	UJ	UJ	UJ	184 J	462	U	U	U	U
Ethyl cyanide	40	UJ	UJ	UJ	UJ	UJ	52.6	U	U	U	U
Isobutyl alcohol	230	UJ	UJ	UJ	71.4 J	59 J	U	U	U	U	U
Methacrylonitrile	110	U	U	U	U	U	U	U	U	U	U

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number		G346DUP	G348	G330	G330DUP	G342	G123S	G120S	G120SDUP	G124S	01TB
Laboratory Sample Number		HA1825	HA1826	HA1827	HA1829	HA1828	HA1804	HA1805	HA1806	HA1807	HA1810
Sampling Date	Quant	11/21/89	11/21/89	11/21/89	11/21/89	11/21/89	11/27/89	11/27/89	11/27/89	11/27/89	11/27/89
Dilution Factor	Limit	50.0	50.0	10.0	10.0	10.0	10/50	1.0/5.0	1.0	1.0	1.0
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
APPENDIX IX P/T VOLATILE COMPOUNDS											
Benzene	4.4	78 J	82.8 J	34 J	33.2 J	U	257	0.92 J	1.01 J	0.76 J	U
Methyl bromide	4.7	U	U	U	U	U	U	U	U	U	U
Carbon disulfide	10	UJ	UJ	UJ	UJ	UJ	UJ	UJ	U	UJ	UJ
Chloroethane	6.0	U	U	U	U	U	U	U	U	U	U
Chlorobenzene	—	U	U	U	U	U	U	U	U	U	U
2-Chloro-1,3-butadiene	3.1	U	U	U	U	U	U	U	U	U	U
Chloroform	10	U	U	U	U	U	U	U	U	U	U
Methyl chloride	1.6	U	U	UJ	UJ	UJ	U	U	U	U	U
3-Chloropropene	10	U	U	U	U	U	U	U	U	U	U
1,2-Dibromo-3-chloropropane	2.2	U	U	U	U	U	U	U	U	U	U
1,2-Dibromoethane	10	U	U	U	U	U	U	U	U	U	U
Dibromoethane	10	U	U	U	U	U	U	U	U	U	U
1,4-Dichloro-2-butene	10	U	U	U	U	U	U	U	U	U	U
Dichlorodifluoromethane	10	U	U	U	U	U	U	555 *	37.8	U	U
1,1-Dichloroethane	4.7	U	U	12.8 J	U	U	U	U	U	U	U
1,2-Dichloroethane	2.8	U	U	U	U	U	U	U	U	U	U
1,2-Trans-dichloroethane	1.6	U	U	52.9	48.9	U	U	U	U	U	U
1,1-Dichloroethene	2.8	61.4 J	U	539	505	34.5	15.1 J	U	U	U	U
Methylene Chloride	5.0	490 JB	481 JB	83 JB	70.6 JB	135 JB	7300 B*	3.87 B	11.9 B	5.86 B	7.18 B
1,2-Dichloropropane	10	U	U	U	U	U	U	U	U	U	U
cis-1,3-Dichloropropane	7.2	U	U	U	U	U	U	U	U	U	U
trans-1,3-Dichloropropane	10	UJ	UJ	UJ	UJ	UJ	U	U	U	U	U
Chlorodibromomethane	10	U	U	U	U	U	U	U	U	U	U
Dichlorobromomethane	10	UJ	UJ	U	U	U	U	U	U	U	U
Ethyl methacrylate	10	U	U	U	U	U	U	U	U	U	U
Iodomethane	10	U	U	U	U	U	U	U	U	U	U
Methyl ethyl ketone	2.8	U	U	U	U	144	U	U	U	U	U
Methyl methacrylate	10	U	U	U	U	U	U	U	U	U	U
Pentachloroethane	10	U	U	U	U	U	U	U	U	U	U
1,1,2,2-Tetrachloroethane	10	U	U	U	U	U	U	U	U	U	U
1,1,2,2-Tetrachloroethane	—	U	U	U	U	U	U	U	U	U	U
Tetrachloroethene	10	U	U	U	U	U	U	U	U	U	U
Carbon tetrachloride	4.1	U	U	U	U	U	U	U	U	U	U
Toluene	4.1	23.9 J	138 J	76 J	24.6 J	U	79.6	1.4 J	1.25 J	0.57 J	U

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number		G348DUP	G348	G330	G330DUP	G342	G123S	G120S	G120SDUP	G124S	01TB
Laboratory Sample Number		HA1825	HA1826	HA1827	HA1829	HA1828	HA1804	HA1805	HA1806	HA1807	HA1810
Sampling Date	Quant	11/21/89	11/21/89	11/21/89	11/21/89	11/21/89	11/27/89	11/27/89	11/27/89	11/27/89	11/27/89
Dilution Factor	Limit	50.0	50.0	10.0	10.0	10.0	10/50	1.0/5.0	1.0	1.0	1.0
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
APPENDIX IX P/T VOLATILE COMPOUNDS (continued)											
Bromoform	6.7	U	U	U	U	U	U	U	U	U	U
1,1,1-Trichloroethane	1	U	U	U	U	U	U	U	U	U	U
1,1,2-Trichloroethane	3.8	U	U	U	U	U	713	U	U	U	U
Trichloroethene	5.0	U	U	70.8	71.4	U	U	U	U	U	U
Trichlorofluoromethane	10	U	U	U	U	U	U	2.4	U	U	U
1,2,3-Trichloropropane	1.9	U	U	U	U	U	U	U	U	U	U
Vinyl Chloride	10	957	954	1100 J	U	UJ	6500 *	U	U	U	U
Acetone	10	634 B	586 B	51.3 J	40.8 JB	875 B	1420 B	10.4 B	21.3 B	20.1 B	15.9 B
Ethylbenzene	7.2	U	127 J	U	U	U	U	U	U	U	U
2-Hexanone	10	U	U	U	U	U	U	U	U	U	U
Methyl isobutyl ketone	10	U	2300	22.0 J	U	425	221	U	U	U	U
Styrene	10	U	U	U	U	U	U	U	U	U	U
Vinyl acetate	10	U	U	U	U	U	U	U	U	U	U
m-Xylene	10	U	324 J	U	U	U	U	U	U	U	U
o,p-Xylenes	10	U	217 J	U	U	U	U	U	U	U	U

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number		G348DUP	G348	G330	G330DUP	G342	G123S	G120S	G120SDUP	G124S	01TB
Laboratory Sample Number		HA1825	HA1826	HA1827	HA1829	HA1828	HA1804	HA1805	HA1806	HA1807	HA1810
Sampling Date	Quant	11/21/89	11/21/89	11/21/89	11/21/89	11/21/89	11/27/89	11/27/89	11/27/89	11/27/89	11/27/89
Dilution Factor	Limit	12.0	12/120	1.0	1.0	1.0	50.0	10.0	1.0	1.0	NA
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
APPENDIX IX SEMIVOLATILE COMPOUNDS											
Acetophenone	17	19.2 J	U	0.78 J	0.75 J	U	U	UJ	2.5 J	U	NA
2-Acetylaminofluorene	17	U	U	U	U	U	U	U	U	U	NA
4-Aminobiphenyl	17	U	U	U	U	U	U	U	U	U	NA
Aniline	1	2680	3250	U	U	U	U	U	U	U	NA
Aramite	1	U	U	U	U	U	U	U	U	U	NA
Benzo(A)anthracene	13	U	U	U	U	U	U	U	U	U	NA
Benzo(b)fluoranthene	8.0	U	U	U	U	U	U	U	U	U	NA
Benzo(a)pyrene	4.2	U	U	U	U	U	U	U	U	U	NA
Bis(2-Chloroethoxy)methane	8.8	U	U	U	U	U	U	U	U	U	NA
Bis(2-chloroethyl) ether	9.5	U	U	U	U	U	U	U	U	U	NA
Bis(2-chloroisopropyl) ether	9.5	U	U	U	U	U	U	U	U	U	NA
Bis(2-Ethylhexyl)phthalate	17	U	U	U	U	U	U	U	U	4.1 J	NA
4-Bromophenylphenyl ether	3.2	U	U	U	U	U	U	U	U	U	NA
Butylbenzylphthalate	17	U	U	U	U	U	U	U	U	U	NA
2-sec-Butyl-4,6-dinitrophen	17	U	R	U	U	U	U	U	U	U	NA
p-Chloraniline	17	5900	6350	U	U	U	U	U	U	U	NA
p-Chloro-m-cresol	5.0	U	R	U	U	U	U	U	U	U	NA
2-Chloranaphthalene	3.2	U	U	U	U	U	U	U	U	U	NA
2-Chlorophenol	5.5	2370	2730 J	U	U	671	U	U	U	U	NA
Chrysene	4.2	U	U	U	U	U	U	U	U	U	NA
Acenaphthene	3.2	U	U	1.23 J	1.34 J	U	U	UJ	4.4 J	U	NA
Acenaphthylene	5.8	U	U	U	U	U	U	U	U	U	NA
Anthracene	3.2	U	U	U	U	U	U	U	U	U	NA
Benzo(ghi)perylene	6.8	U	U	U	U	U	U	U	U	U	NA
Benzo(k)fluoranthene	4.2	U	U	U	U	U	U	U	U	U	NA
Fluorene	3.2	U	U	1.3 J	1.4 J	U	U	UJ	5.94 J	U	NA
Phenanthrene	9.0	U	U	2.4 J	2.6 J	U	U	UJ	5.34 J	U	NA
Pyrene	3.2	U	U	0.65 J	0.85 J	U	U	U	U	U	NA
2-Nitrophenol	6.0	U	R	U	U	U	U	R	U	U	NA
o-Cresol	17	U	R	U	1.4 J	U	U	R	U	U	NA
m+p-Cresols	17	206	233 J	30.7	27.2	339	310 J	R	U	U	NA
Diallate	17	U	U	U	U	U	U	U	U	U	NA
Dibenzo(a,h)anthracene	4.2	U	U	U	U	U	U	U	U	U	NA
Di-n-butyl phthalate	17	U	U	U	0.44 J	U	U	U	U	U	NA
1,2-Dichlorobenzene	3.2	U	U	U	U	U	U	U	U	U	NA
1,3-Dichlorobenzene	3.2	U	U	U	U	U	U	U	U	U	NA
1,4-Dichlorobenzene	7.3	U	U	U	U	U	U	U	U	U	NA
3,3-Dichlorobenzidine	27.5	U	U	U	U	U	U	U	U	U	NA
2,4-Dichlorophenol	4.5	237	186 J	22.6	21.8	464	334	R	U	U	NA
2,6-Dichlorophenol	17	U	R	5.0 J	5.4 J	288	105 J	R	U	U	NA

continued next page (see last page of table for notes)



TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number		G346DUP	G348	G330	G330DUP	G342	G123S	G120S	G120SDUP	G124S	01TB
Laboratory Sample Number		HA1825	HA1826	HA1827	HA1829	HA1828	HA1804	HA1805	HA1806	HA1807	HA1810
Sampling Date	Quant	11/21/89	11/21/89	11/21/89	11/21/89	11/21/89	11/27/89	11/27/89	11/27/89	11/27/89	11/27/89
Dilution Factor	Limit	12.0	12/120	1.0	1.0	1.0	50.0	10.0	1.0	1.0	NA
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
APPENDIX IX SEMIVOLATILE COMPOUNDS (continued)											
Diethylphthalate	17	U	U	U	U	U	U	U	U	R	NA
p-Dimethylaminoazobenzene	17	U	U	U	U	U	U	U	U	U	NA
7,12-Dimethylbenzo(a)anthra	17	U	U	U	U	U	U	U	U	U	NA
3,3-Dimethylbenzidine	17	U	U	U	U	U	U	U	U	U	NA
a-a-Dimethylphenethylamine	-	U	U	U	U	U	U	U	U	U	NA
2,4-Dimethylphenol	4.5	13.9 J	14.7 J	1.7 J	1.6 J	29.1	U	R	2.0 J	U	NA
Dimethyl phthalate	17	U	U	U	U	U	U	U	U	R	NA
m-Dinitrobenzene	17	U	U	U	U	U	U	U	U	U	NA
4,6-Dinitro-0-cresol	40	U	R	U	U	U	U	U	R	U	NA
2,4-Dinitrophenol	70	U	R	U	U	U	U	U	R	U	NA
2,4-Dinitrotoluene	9.5	U	U	U	U	U	U	U	U	U	NA
2,6-Dinitrotoluene	3.2	U	U	U	U	U	U	U	U	U	NA
Di-n-octyl phthalate	1	U	U	U	U	U	U	U	27	U	NA
Diphenylamine	17	U	U	U	U	U	U	U	U	U	NA
N-nitrosodipropylamine	17	U	U	U	U	U	U	U	U	U	NA
Ethyl methanesulfonate	17	U	U	U	U	U	U	U	U	U	NA
Fluoranthene	3.7	U	U	0.84 J	1.01 J	U	U	U	U	U	NA
Hexachlorobenzene	3.2	U	U	U	U	U	U	U	U	U	NA
Hexachlorobutadiene	1.5	U	U	U	U	U	U	U	U	U	NA
Hexachlorocyclopentadiene	17	U	U	U	U	U	U	U	U	U	NA
Hexachloroethane	2.7	U	U	U	U	U	U	U	U	U	NA
Isodrin	9.8	U	U	U	U	U	U	U	U	U	NA
Hexachlorophene	17	U	U	U	U	U	U	U	U	R	NA
Hexachloropropene	17	U	U	U	U	U	U	U	U	U	NA
Indeno(1,2,3-c,d)pyrene	6.2	U	U	U	U	U	U	U	U	U	NA
Isosafrole	17	U	U	U	U	U	U	U	U	U	NA
Methapyrilene	-	U	U	U	U	U	U	U	U	U	NA
3-Methylcholanthrene	9.2	U	U	U	U	U	U	U	U	U	NA
Methyl methanesulfonate	17	U	U	U	U	U	U	U	U	U	NA
Naphthalene	2.7	40.9	42.14	6.2	6.22	U	U	U	15.2 J	U	NA
1,4-Naphthoquinone	17	U	U	U	U	U	U	U	U	U	NA
1-Naphthylamine	17	U	U	U	U	U	U	U	U	U	NA
2-Naphthylamine	17	U	U	U	U	U	U	U	U	U	NA
p-Nitroaniline	17	U	U	U	U	U	U	U	U	U	NA
Nitrobenzene	3.2	U	U	U	U	U	U	U	U	U	NA
4-Nitrophenol	4.0	U	R	U	U	U	U	R	U	U	NA
4-Nitroquinoline-N-oxide	-	U	U	U	U	U	U	U	U	U	NA
N-Nitrosodiphenylamine	3.2	U	U	U	U	U	U	U	U	U	NA
N-Nitrosodi-n-butylamine	17	U	U	U	U	U	U	U	U	U	NA
N-Nitrosodiethylamine	17	U	U	U	U	U	U	U	U	U	NA
N-Nitrosodimethylamine	17	U	U	U	U	U	U	U	U	U	NA
N-Nitrosomethylethylamine	17	U	U	U	U	U	U	U	U	U	NA

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number Laboratory Sample Number Sampling Date Dilution Factor Units	Quant Limit ug/L	G348DUP HA1825 11/21/89 12.0 ug/L	G348 HA1826 11/21/89 12/120 ug/L	G330 HA1827 11/21/89 1.0 ug/L	G330DUP HA1829 11/21/89 1.0 ug/L	G342 HA1828 11/21/89 1.0 ug/L	G123S HA1804 11/27/89 50.0 ug/L	G120S HA1805 11/27/89 10.0 ug/L	G120SDUP HA1806 11/27/89 1.0 ug/L	G124S HA1807 11/27/89 1.0 ug/L	01TB HA1810 11/27/89 NA ug/L
APPENDIX IX SEMIVOLATILE COMPOUNDS (continued)											
N-Nitrosomorpholine	17	U	U	U	U	U	U	U	U	U	NA
N-Nitrosopiperidine	17	U	U	U	U	U	U	U	U	U	NA
N-Nitrosopyrrolidine	17	U	U	U	U	U	U	U	U	U	NA
5-Nitro-o-toluidine	17	U	U	U	U	U	U	U	U	U	NA
Pentachlorobenzene	17	U	U	U	U	U	U	U	U	U	NA
Pentachloronitrobenzene	17	U	U	U	U	U	U	U	U	U	NA
Pentachlorophenol	6.0	U	R	U	U	U	U	R	U	U	NA
Phenacetin	17	U	U	U	U	U	U	U	U	U	NA
Phenol	2.5	U	231 J	22	22.3	67700	U	U	U	U	NA
m-phenylenediamine	17	U	U	U	U	U	U	U	U	U	NA
o-phenylenediamine	17	U	U	U	U	U	U	U	U	U	NA
p-phenylenediamine	17	U	U	U	U	U	U	U	U	U	NA
2-Picoline	17	U	U	U	U	U	U	U	U	U	NA
Pronamide	17	U	U	U	U	U	U	U	U	U	NA
Pyridine	17	U	U	2.8 J	2.8 J	U	U	U	U	U	NA
Safrole	17	U	U	U	U	U	U	U	U	U	NA
1,2,4,5-Tetrachlorobenzene	17	U	U	U	U	U	U	U	U	U	NA
2,3,4,6-Tetrachlorophenol	17	U	R	U	U	U	U	R	U	U	NA
Tetraethyldithiopyrophospha	17	U	U	U	U	U	U	U	U	U	NA
o-Toluidine	17	242	283	U	U	U	U	U	U	U	NA
1,2,4-Trichlorobenzene	3.2	U	U	U	U	U	U	U	U	U	NA
2,4,5-Trichlorophenol	17	U	R	U	U	U	U	R	U	U	NA
2,4,6-Trichlorophenol	4.5	U	R	U	U	28.2	U	R	U	U	NA
0,0,0-Triethyl phosphorothi	17	U	U	U	U	U	U	U	U	U	NA
sym-Trinitrobenzene	17	U	U	U	U	U	U	U	U	U	NA
Benzyl alcohol	17	U	U	U	U	U	U	U	U	U	NA
Dibenzofuran	17	U	U	0.63 J	0.67 J	U	U	U	U	U	NA
Isophorone	3.7	U	11.3 J	U	U	U	U	U	U	U	NA
2-Methylnaphthalene	17	8.8 J	8.8 J	2.13 J	2.26 J	U	U	UJ	7.3 J	U	NA
o-Nitroaniline	17	U	U	U	U	U	U	U	U	U	NA
m-Nitroaniline	17	U	U	U	U	U	U	U	U	U	NA
4-Chlorophenyl phenyl ether	7.0	U	U	U	U	U	U	U	U	U	NA

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number	G348DUP	G348	G330	G330DUP	G342	G123S	G120S	G120SDUP	G124S	G1TB
Laboratory Sample Number	HA1825	HA1826	HA1827	HA1829	HA1828	HA1804	HA1805	HA1806	HA1807	HA1810
Sampling Date	11/21/89	11/21/89	11/21/89	11/21/89	11/21/89	11/27/89	11/27/89	11/27/89	11/27/89	11/27/89
Units	ng/L (ppt)	ng/L (ppt)	ng/L (ppt)	ng/L (ppt)	ng/L (ppt)	ng/L (ppt)	ng/L (ppt)	ng/L (ppt)	ng/L (ppt)	ng/L (ppt)
PCDD/PCDF										
2,3,7,8-TCDD	1.45 U	1.1 U	0.77 U	1.57 U	1.22 U	1.23 U	3.37 U	0.95 U	1.43 U	NA
TCDD	2.18 U	2.61 U	1.18 U	1.83 U	1.59 U	1.23 U	3.99 U	1.66 U	2.2 U	NA
PCDD	7.26 U	8.17 U	4.06 U	5.14 U	4.0 U	5.35 U	10.3 U	4.95 U	6.33 U	NA
HxCDD	0.28 U	0.22 U	0.28 U	0.39 U	0.4 U	0.32 U	0.57 U	0.51 U	0.34 U	NA
2,3,7,8-TCDF	0.25 U	0.16 U	0.16 U	0.32 U	0.33 U	0.28 U	0.58 U	0.23 U	0.23 U	NA
TCDF	0.3 U	0.3 U	0.34 U	0.37 U	0.33 U	0.33 U	0.79 U	0.39 U	0.31 U	NA
PCDF	0.87 U	0.86 U	0.64 U	0.86 U	1.01 U	0.87 U	1.19 U	0.72 U	0.48 U	NA
HxCDF	0.58 U	0.52 U	0.47 U	0.83 U	0.88 U	0.84 U	1.26 U	0.91 U	0.74 U	NA

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number		G348DUP	G348	G330	G330DUP	G342	G123S	G120S	G120SDUP	G124S	01TB
Laboratory Sample Number		HA1825	HA1826	HA1827	HA1829	HA1828	HA1804	HA1805	HA1806	HA1807	HA1810
Sampling Date	Quant	11/21/89	11/21/89	11/21/89	11/21/89	11/21/89	11/27/89	11/27/89	11/27/89	11/27/89	11/27/89
Dilution Factor	Limit	10.0	10.0	10.0	10.0	10.0	1.0	1.0	1.0	1.0	NA
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
APPENDIX IX PESTICIDE & HERBICIDE COMPOUNDS											
Alpha-BHC	0.05	U	U	U	U	U	U	U	U	U	NA
Chlordane	1.0	U	U	U	U	U	U	U	U	U	NA
Chlorobenzilate	2.5	U	U	U	U	U	U	U	U	U	NA
4,4'-DDD	0.10	U	U	U	U	U	U	U	U	U	NA
4,4'-DDE	0.10	U	U	U	U	U	U	U	U	U	NA
4,4'-DDT	0.10	U	U	U	U	U	U	U	U	U	NA
Dieldrin	0.10	U	U	U	U	U	U	U	U	U	NA
Endosulfan I	0.05	U	U	U	U	U	U	U	U	U	NA
Endosulfan II	0.10	U	U	U	U	U	U	U	U	U	NA
Endosulfan Sulfate	0.10	U	U	U	U	U	U	U	U	U	NA
Endrin	0.10	U	U	U	U	U	U	U	U	U	NA
Endrin Aldehyde	0.10	U	U	U	U	U	U	U	U	U	NA
Hepatchlor	0.05	U	U	U	U	U	U	U	U	U	NA
Hepatchlor Epoxide	0.05	U	U	U	U	U	U	U	U	U	NA
Beta-BHC	0.05	U	U	U	U	U	U	U	U	U	NA
Delta-BHC	0.05	U	U	U	U	U	U	U	U	U	NA
Gamma-BHC (Lindane)	0.05	U	U	U	U	U	U	U	U	U	NA
Kepone	0.55	U	U	U	U	U	U	U	U	U	NA
Methoxychlor	0.55	U	U	U	U	U	U	U	U	U	NA
Toxaphene	2.0	U	U	U	U	U	U	U	U	U	NA
Arochlor-1016	0.50	U	U	U	U	U	U	U	U	U	NA
Arochlor-1221	0.50	U	U	U	U	U	U	U	U	U	NA
Arochlor-1232	0.50	U	U	U	U	U	U	U	U	U	NA
Arochlor-1242	0.50	U	U	U	U	U	U	U	U	U	NA
Arochlor-1248	0.50	U	U	U	U	U	U	U	U	U	NA
Arochlor-1254	1	U	U	U	U	U	U	U	U	U	NA
Arochlor-1260	1.0	U	U	U	U	U	U	U	U	U	NA
Thionazin	1.0	U	U	U	U	U	U	U	U	U	NA
Dimethoate	2.5	U	U	U	U	U	U	U	U	U	NA
Disulfoton	0.55	U	U	U	U	U	U	U	U	U	NA
Methyl parathion	1.0	U	U	U	U	U	U	U	U	U	NA
Parathion	1.0	U	U	U	U	U	U	U	U	U	NA
Phorate	2.5	3.45 J	3.01 J	U	U	U	U	U	U	U	NA
Famphur	10	U	U	U	U	U	U	U	U	U	NA
2,4-D	3.8	U	U	U	U	U	U	U	U	U	NA
2,4,5-T	0.76	U	U	U	U	U	1.04 J	U	U	U	NA
2,4,5-TP (Silvex)	0.76	U	U	U	U	U	U	U	U	U	NA

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number Laboratory Sample Number Sampling Date Units	Quant Limit ug/L	G348DUP HA1825 11/21/89 ug/L	G348 HA1826 11/21/89 ug/L	G330 HA1827 11/21/89 ug/L	G330DUP HA1829 11/21/89 ug/L	G342 HA1828 11/21/89 ug/L	G123S HA1804 11/27/89 ug/L	G120S HA1805 11/27/89 ug/L	G120SDUP HA1806 11/27/89 ug/L	G124S HA1807 11/27/89 ug/L	01TB HA1810 11/27/89 ug/L
<b>APPENDIX IX INORGANIC PARAMETERS</b>											
Aluminum	60	U	U	U	BMDL J	U	U	U	U	U	NA
Arsenic	100	BMDL J	65	BMDL J	54	1600	BMDL J	55	53	BMDL J	NA
Barium	20	700	880	220	240	480	1500	980	1000	140	NA
Beryllium	1.0	9	9.4	2.7	2.8	35	BMDL J	U	BMDL J	BMDL J	NA
Cadmium	3.0	22	22	11	9.8	70	5 J	7.9	9.1	7.3	NA
Calcium	200	241000	227000	179000	190000	1420000	387000 J	140000	146000	515000	NA
Chromium	10	130	140	78	83	490	59 J	20	37	150	NA
Cobalt	20	23	28	27	30	51	BMDL J	U	BMDL J	BMDL J	NA
Copper	10	82	130	88	110	280	35	17	22	34	NA
Iron	150	59700	72700	53400	67400	167000	15200 J	245000	28400	15600	NA
Lead	5.0	780	840	210	240	360	110	30	41	59	NA
Magnesium	100	124000	123000	70700	65500	74800	180000 J	326000	346000	128000	NA
Mercury	0.20	0.74	0.69	0.37	0.41	0.55	0.24 J	BMDL J	0.2	BMDL J	NA
Nickel	20	75	90	67	73	190	56 J	BMDL J	27	51	NA
		435000	439000	29000	27000	156000	231000	31000	33000	48000	NA
Selenium	5.0	BMDL J	8.7 J	BMDL J	BMDL J	BMDL J	BMDL J	UJ	U	BMDL J	NA
Silver	10	BMDL J	UJ	BMDL J	U	12	BMDL J	UJ	BMDL J	10 J	NA
		355000	346000	236000	217000	1080000	742000	126000	128000	272000	NA
Thallium	10	BMDL J	BMDL J	UJ	UJ	BMDL J	UJ	UJ	UJ	UJ	NA
Tin	50	U	BMDL J	U	BMDL J	U	U	U	U	U	NA
Vanadium	20	240	230	120	120	1300	38	36	44	35	NA
Zinc	20	1200	13000	360 B	360 B	3050	130 B	130 B	160 B	140 B	NA
<b>CONVENTIONAL PARAMETERS</b>											
Chloride (mg/L)	1.0	1043	1024	371	1776	1752	2092	291	29.7	1195	NA
Cyanide, (total) (mg/L)	0.01	U	U	U	U	U	U	U	U	U	NA
Sulfate as SO4 (mg/L)	50	158	154	280	259	1850	91.6	U	U	650	NA
Sulfate as S (mg/L)	0.25	2.4	2.3	4.7	4.5	2.8	1.2	0.62	0.86	U	NA

**LEGEND:**

- U Compound was not detected at laboratory method detection limit.
- J Estimated value due to limitations identified during the quality assurance review.
- UJ reported method detection limit is estimated due to limitations identified during the quality assurance review.
- B Compound was detected in a laboratory and/or field blank at similar concentrations. May represent laboratory and/or field contamination
- R Unreliable result. Compound may or may not be present.
- \* Sample analyzed at multiple dilutions. Summary table is a hybrid of diluted and undiluted results.
- No standard available. Compound was qualitatively searched for.
- NA Not Analyzed
- NP Not Provided
- IND Indeterminate. Standard and/or spikes could not be detected at method detection limit.
- BMDL Below Method Detection Limit reported by laboratory.

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number		06FB	G332	G324	02FB	02TB	G303
Laboratory Sample Number		HA1809	HA1830	HA1831	HA1839	HA1840	HA1836
Sampling Date	Quant	11/28/89	11/28/89	11/28/89	11/28/89	11/28/89	12/04/89
Dilution Factor	Limit	1.0	1.0/100	1.0	1.0	1.0	1.0
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
APPENDIX IX HEATED P/T VOLATILE COMPOUNDS							
Acetonitrile	15	U	1860 *	74.6	U	U	391
Acrolein	20	U	U	U	U	U	UJ
Acrylonitrile	10	U	U	U	U	U	UJ
1,4-Dioxane	300	U	U	U	U	U	U
Ethyl cyanide	40	U	U	U	U	U	U
Isobutyl alcohol	230	U	3720 *	U	U	U	U
Methacrylonitrile	110	U	U	U	U	U	UJ

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number		06FB	G332	G324	02FB	02TB	G303
Laboratory Sample Number		HA1809	HA1830	HA1831	HA1839	HA1840	HA1836
Sampling Date	Quant	11/28/89	11/28/89	11/28/89	11/28/89	11/28/89	12/04/89
Dilution Factor	Limit	1.0	200.0	2.0	1.0	1.0	1.0
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
APPENDIX IX P/T VOLATILE COMPOUNDS							
Benzene	4.4	U	20900	71.9	U	U	0.93 J
Methyl bromide	4.7	U	UJ	U	U	U	UJ
Carbon disulfide	10	UJ	UJ	UJ	UJ	UJ	UJ
Chloroethane	6.0	U	U	U	U	U	U
Chlorobenzene	-	U	U	15.9	U	U	U
2-Chloro-1,3-butadiene	3.1	U	U	U	U	U	U
Chloroform	10	U	U	U	U	U	U
Methyl chloride	1.6	U	U	U	U	U	U
3-Chloropropene	10	U	U	U	U	U	U
1,2-Dibromo-3-chloropropan	2.2	U	U	U	U	U	U
1,2-Dibromoethane	10	U	U	U	U	U	U
Dibromoethane	10	U	U	U	U	U	U
1,4-Dichloro-2-butene	10	U	U	U	U	U	U
Dichlorodifluoromethane	10	U	U	U	U	U	526
1,1-Dichloroethane	4.7	U	U	15.4	U	U	U
1,2-Dichloroethane	2.8	U	U	47.7	U	U	U
1,2-Trans-dichloroethene	1.6	U	U	U	U	U	U
1,1-Dichloroethene	2.8	U	358000	U	U	U	U
Methylene Chloride	5.0	4.69 B	67100 B	43.7 B	5.54 B	6.82 B	8.35 B
1,2-Dichloropropane	10	U	U	U	U	U	U
cis-1,3-Dichloropropene	7.2	U	U	U	U	U	U
trans-1,3-Dichloropropene	10	U	U	U	U	U	U
Chlorodibromomethane	10	U	U	U	U	U	U
Dichlorobromomethane	10	U	U	U	U	U	U
Ethyl methacrylate	10	U	U	U	U	U	U
Iodomethane	10	U	U	U	U	U	U
Methyl ethyl ketone	2.8	U	U	U	U	U	U
Methyl methacrylate	10	U	U	U	U	U	U
Pentachloroethane	10	U	U	U	U	U	U
1,1,2,2-Tetrachloroethane	10	U	U	U	U	U	U
1,1,2,2-Tetrachloroethane	-	U	U	U	U	U	U
Tetrachloroethene	10	U	U	U	U	U	U
Carbon tetrachloride	4.1	U	U	U	U	U	U
Toluene	4.1	1.5 J	14700	25.1	0.98 J	U	U

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number		06FB	G332	G324	02FB	02TB	G303
Laboratory Sample Number		HA1809	HA1830	HA1831	HA1839	HA1840	HA1836
Sampling Date	Quant	11/28/89	11/28/89	11/28/89	11/28/89	11/28/89	12/04/89
Dilution Factor	Limit	1.0	200.0	2.0	1.0	1.0	1.0
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
APPENDIX IX P/T VOLATILE COMPOUNDS (continued)							
Bromoform	6.0	U	U	U	U	U	U
1,1,1-Trichloroethane	1.6	U	U	U	U	U	U
1,1,2-Trichloroethane	3.8	U	U	U	U	U	U
Trichloroethene	5.0	U	U	U	U	U	U
Trichlorofluoromethane	10	U	U	U	U	U	U
1,2,3-Trichloropropane	1.9	U	U	U	U	U	U
Vinyl Chloride	10	U	271000	U	U	U	U
Acetone	10	6.3 JB	1320 JB	46.7 JB	7.15 JB	U	14.3
Ethylbenzene	7.2	U	U	U	U	U	0.96 JB
2-Hexanone	10	U	U	U	U	U	U
Methyl isobutyl ketone	10	U	U	10.89 J	U	U	U
Styrene	10	U	U	U	U	U	U
Vinyl acetate	10	U	U	U	U	U	U
m-Xylene	10	U	U	0.54 J	U	U	2.21 J
o,p-Xylenes	10	U	U	4.1 J	U	U	0.94 J

continued next page (see last page of table for notes)



TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number		06FB	G332	G324	02FB	02TB	G303
Laboratory Sample Number		HA1809	HA1830	HA1831	HA1839	HA1840	HA1836
Sampling Date	Quant	11/28/89	11/28/89	11/28/89	11/28/89	11/28/89	12/04/89
Dilution Factor	Limit	1.0	50.0	20.0	1.0	NA	1.0
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
APPENDIX IX SEMIVOLATILE COMPOUNDS							
Acetophenone	17	U	UJ	UJ	U	NA	U
2-Acetylaminofluorene	17	U	UJ	UJ	U	NA	U
4-Aminobiphenyl	17	UJ	UJ	UJ	U	NA	U
Aniline	17	U	UJ	UJ	U	NA	U
Aramite	17	U	UJ	UJ	U	NA	U
Benzo(A)anthracene	13	U	UJ	UJ	U	NA	U
Benzo(b)fluoranthene	8.0	U	UJ	UJ	U	NA	U
Benzo(a)pyrene	4.2	U	UJ	UJ	U	NA	U
Bis(2-Chloroethoxy)methane	8.8	U	UJ	UJ	U	NA	U
Bis(2-chloroethyl) ether	9.5	U	UJ	UJ	U	NA	U
Bis(2-chloroisopropyl)ether	9.5	U	UJ	UJ	U	NA	U
Bis(2-Ethylhexyl)phthalate	17	4.14 J	UJ	UJ	U	NA	10.8 J
4-Bromophenylphenyl ether	3.2	U	UJ	UJ	U	NA	U
Butylbenzylphthalate	17	U	UJ	UJ	U	NA	U
2-sec-Butyl-4,6-dinitrophen	17	U	U	U	U	NA	U
p-Chloraniline	17	U	U	U	U	NA	U
p-Chloro-m-cresol	5.0	U	U	U	U	NA	U
2-Chloranaphthalene	3.2	U	UJ	UJ	U	NA	U
2-Chlorophenol	5.5	U	58 J	33.9 J	U	NA	U
Chrysene	4.2	U	UJ	UJ	U	NA	U
Acenaphthene	3.2	U	UJ	UJ	U	NA	3.14
Acenaphthylene	5.8	U	UJ	UJ	U	NA	U
Anthracene	3.2	U	UJ	UJ	U	NA	U
Benzo(ghi)perylene	6.8	U	UJ	UJ	U	NA	U
Benzo(k)fluoranthene	4.2	U	UJ	UJ	U	NA	U
Fluorene	3.2	U	UJ	UJ	U	NA	1.38 J
Phenanthrene	9.0	U	UJ	UJ	U	NA	2.14 J
Pyrene	3.2	U	UJ	UJ	U	NA	1.02 J
2-Nitrophenol	6.0	U	U	U	U	NA	U
o-Cresol	17	U	U	35 J	U	NA	U
m+p-Cresols	17	U	332 J	221 J	U	NA	U
Diallate	17	U	UJ	UJ	U	NA	U
Dibenzo(a,h)anthracene	4.2	U	UJ	UJ	U	NA	U
Di-n-butyl phthalate	17	U	UJ	UJ	U	NA	0.78 J
1,2-Dichlorobenzene	3.2	U	UJ	UJ	U	NA	U
1,3-Dichlorobenzene	3.2	U	UJ	UJ	U	NA	U
1,4-Dichlorobenzene	7.3	U	UJ	UJ	U	NA	U
3,3-Dichlorobenzidine	27.5	U	UJ	UJ	U	NA	U
2,4-Dichlorophenol	4.5	U	493	37.2 J	U	NA	U
2,6-Dichlorophenol	17	U	48.3	U	U	NA	UJ

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number		06FB	G332	G324	02FB	02TB	G303
Laboratory Sample Number		HA1809	HA1830	HA1831	HA1839	HA1840	HA1836
Sampling Date	Quant	11/28/89	11/28/89	11/28/89	11/28/89	11/28/89	12/04/89
Dilution Factor	Limit	1.0	50.0	20.0	1.0	NA	1.0
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
APPENDIX IX SEMIVOLATILE COMPOUNDS (continued)							
Diethylphthalate	17	R	R	R	R	NA	R
p-Dimethylaminoazobenzene	17	U	UJ	UJ	U	NA	U
7,12-Dimethylbenzo(a)anthra	17	U	UJ	UJ	U	NA	U
3,3-Dimethylbenzidine	17	U	UJ	UJ	U	NA	UJ
a-a-Dimethylphenethylamine	-	U	UJ	UJ	U	NA	U
2,4-Dimethylphenol	4.5	U	U	40 J	U	NA	U
Dimethyl phthalate	17	R	R	R	R	NA	R
m-Dinitrobenzene	17	U	UJ	UJ	U	NA	U
4,6-Dinitro-0-cresol	40	U	U	U	U	NA	U
2,4-Dinitrophenol	70	U	U	U	U	NA	U
2,4-Dinitrotoluene	9.5	U	UJ	UJ	U	NA	U
2,6-Dinitrotoluene	3.2	U	UJ	UJ	U	NA	U
Di-n-octyl phthalate	17	U	UJ	UJ	U	NA	U
Diphenylamine	17	U	UJ	UJ	U	NA	U
N-nitrosodipropylamine	17	U	UJ	UJ	U	NA	U
Ethyl methanesulfonate	17	U	UJ	UJ	U	NA	U
Fluoranthene	3.7	U	UJ	UJ	U	NA	1.21 J
Hexachlorobenzene	3.2	U	UJ	UJ	U	NA	U
Hexachlorobutadiene	1.5	U	UJ	UJ	U	NA	U
Hexachlorocyclopentadiene	17	U	UJ	UJ	U	NA	U
Hexachloroethane	2.7	U	UJ	UJ	U	NA	U
Isodrin	9.8	U	UJ	UJ	U	NA	U
Hexachlorophene	17	R	UJ	UJ	R	NA	R
Hexachloropropene	17	U	UJ	UJ	U	NA	U
Indeno(1,2,3-c,d)pyrene	6.2	U	UJ	UJ	U	NA	U
Isosafrole	17	U	UJ	UJ	U	NA	U
Methapyrene	-	U	UJ	UJ	U	NA	U
3-Methylcholanthrene	9.2	U	UJ	UJ	U	NA	U
Methyl methanesulfonate	17	U	UJ	UJ	U	NA	U
Naphthalene	2.7	U	34.8 J	46.5 J	U	NA	2.78
1,4-Naphthoquinone	17	U	UJ	UJ	U	NA	U
1-Naphthylamine	17	U	UJ	UJ	U	NA	U
2-Naphthylamine	17	U	UJ	UJ	U	NA	U
p-Nitroaniline	17	U	UJ	UJ	U	NA	U
Nitrobenzene	3.2	U	UJ	UJ	U	NA	U
4-Nitrophenol	4.0	U	U	U	U	NA	U
4-Nitroquinoline-N-oxide	-	U	UJ	UJ	U	NA	U
N-Nitrosodiphenylamine	3.2	U	UJ	UJ	U	NA	U
N-Nitrosodi-n-butylamine	17	U	UJ	UJ	U	NA	U
N-Nitrosodiethylamine	17	U	UJ	UJ	U	NA	U
N-Nitrosodimethylamine	17	U	UJ	UJ	U	NA	U
N-Nitrosomethylethylamine	17	U	UJ	UJ	U	NA	U

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number		06FB	G332	G324	02FB	02TB	G303
Laboratory Sample Number		HA1809	HA1830	HA1831	HA1839	HA1840	HA1836
Sampling Date	Quant	11/28/89	11/28/89	11/28/89	11/28/89	11/28/89	12/04/89
Dilution Factor	Limit	1.0	50.0	20.0	1.0	NA	1.0
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
APPENDIX IX SEMIVOLATILE COMPOUNDS (continued)							
N-Nitrosomorpholine	17	U	UJ	UJ	U	NA	U
N-Nitrosopiperidine	17	U	UJ	UJ	U	NA	U
N-Nitrosopyrrolidine	17	U	UJ	UJ	U	NA	U
5-Nitro-o-toluidine	17	U	UJ	UJ	U	NA	U
Pentachlorobenzene	17	U	UJ	UJ	U	NA	U
Pentachloronitrobenzene	17	U	UJ	UJ	U	NA	U
Pentachlorophenol	6.0	U	U	U	U	NA	U
Phenacetin	17	U	UJ	UJ	U	NA	U
Phenol	2.5	U	4590	U	U	NA	7.04
m-phenylenediamine	17	U	UJ	UJ	U	NA	U
o-phenylenediamine	17	U	UJ	UJ	U	NA	U
p-phenylenediamine	17	U	UJ	UJ	U	NA	U
2-Picoline	17	U	UJ	UJ	U	NA	U
Pronamide	17	U	UJ	UJ	U	NA	U
Pyridine	17	U	UJ	UJ	U	NA	U
Safrole	17	U	UJ	UJ	U	NA	U
1,2,4,5-Tetrachlorobenzene	17	U	UJ	UJ	U	NA	U
2,3,4,6-Tetrachlorophenol	17	U	U	U	U	NA	U
Tetraethyldithiopyrophospha	-	U	UJ	UJ	U	NA	U
o-Toluidine	17	U	UJ	UJ	U	NA	U
1,2,4-Trichlorobenzene	3.2	U	UJ	UJ	U	NA	U
2,4,5-Trichlorophenol	17	U	U	U	U	NA	U
2,4,6-Trichlorophenol	4.5	U	U	U	U	NA	U
0,0,0-Triethyl phosphorothi	-	U	UJ	UJ	U	NA	U
sym-Trinitrobenzene	-	U	UJ	UJ	U	NA	U
Benzyl alcohol	17	U	UJ	UJ	U	NA	U
Dibenzofuran	17	U	UJ	UJ	U	NA	1.2 J
Isophorone	3.7	U	UJ	UJ	U	NA	U
2-Methylnaphthalene	17	U	UJ	UJ	U	NA	U
o-Nitroaniline	17	U	UJ	UJ	U	NA	U
m-Nitroaniline	17	U	UJ	UJ	U	NA	U
4-Chlorophenyl phenyl ether	7.0	U	UJ	UJ	U	NA	U

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number	06FB	G332	G324	02FB	02TB	G303
Laboratory Sample Number	HA1809	HA1830	HA1831	HA1839	HA1840	HA1836
Sampling Date	11/28/89	11/28/89	11/28/89	11/28/89	11/28/89	12/04/89
Units	ng/L (ppt)	ng/L (ppt)	ng/L (ppt)	ng/L (ppt)	ng/L (ppt)	ng/L (ppt)
PCDD/PCDF						
2,3,7,8-TCDD	1.01 U	0.92 U	1.21 U	0.95 U	NA	R
TCDD	2.0 U	0.98 U	1.21 U	1.2 U	NA	R
PCDD	4.85 U	4.2 U	5.02 U	5.99 U	NA	R
HxCDD	0.30 U	0.38 U	0.42 U	0.33 U	NA	R
2,3,7,8-TCDF	0.33 U	0.24 U	0.27 U	0.24 U	NA	R
TCDF	0.30 U	0.38 U	0.67 U	0.46 U	NA	R
PCDF	0.56 U	0.54 U	0.95 U	0.69 U	NA	R
HxCDF	0.57 U	0.69 U	1.04 U	1.0 U	NA	R

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number		06FB	G332	G324	02FB	02TB	G503
Laboratory Sample Number		HA1809	HA1830	HA1831	HA1839	HA1840	HA1836
Sampling Date	Quant	11/28/89	11/28/89	11/28/89	11/28/89	11/28/89	12/04/89
Dilution Factor	Limit	1.0	1.0	1.0	1.0	NA	1.0
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
APPENDIX IX PESTICIDE & HERBICIDE COMPOUNDS							
Alpha-BHC	0.05	U	U	U	U	U	U
Chlordane	1.0	U	U	U	U	U	U
Chlorobenzilate	2.5	U	U	U	U	U	U
4,4'-DDD	0.10	U	U	U	U	U	U
4,4'-DDE	0.10	U	U	U	U	U	U
4,4'-DDT	0.10	U	U	U	U	U	U
Dieldrin	0.10	U	U	U	U	U	U
Endosulfan I	0.05	U	U	U	U	U	U
Endosulfan II	0.10	U	U	U	U	U	U
Endosulfan Sulfate	0.10	U	U	U	U	U	U
Endrin	0.10	U	U	U	U	U	U
Endrin Aldehyde	0.10	U	U	U	U	U	U
Hepatchlor	0.05	U	U	U	U	U	U
Hepatchlor Epoxide	0.05	U	U	U	U	U	U
Beta-BHC	0.05	U	U	U	U	U	U
Delta-BHC	0.05	U	U	U	U	U	U
Gamma-BHC (Lindane)	0.05	U	U	U	U	U	U
Kepon	0.55	U	U	U	U	U	U
Methoxychlor	0.55	U	U	U	U	U	U
Toxaphene	2.0	U	U	U	U	U	U
Arochlor-1016	0.50	U	U	U	U	U	U
Arochlor-1221	0.50	U	U	U	U	U	U
Arochlor-1232	0.50	U	U	U	U	U	U
Arochlor-1242	0.50	U	U	U	U	U	U
Arochlor-1248	0.50	U	U	U	U	U	U
Arochlor-1254	1.0	U	U	U	U	U	U
Arochlor-1260	1.0	U	U	U	U	U	U
Thionazin	1.0	U	U	U	U	U	U
Dimethoate	2.5	U	U	U	U	U	U
Disulfoton	0.55	U	U	U	U	U	U
Methyl parathion	1.0	U	U	U	U	U	U
Parathion	1.0	U	U	U	U	U	U
Phorate	2.5	U	U	U	U	U	U
Famphur	10	U	U	U	U	U	U
2,4-D	3.8	U	U	U	U	U	U
2,4,5-T	0.76	U	1.09	U	U	U	U
2,4,5-TP (Silvex)	0.76	U	U	U	U	U	U

continued next page (see last page of table for notes)

**TABLE 2 (continued)**  
**SUMMARY OF ANALYTICAL RESULTS**  
**PHASE I INVESTIGATION**  
**CHEMICAL WASTE MANAGEMENT**  
**CHICAGO, ILLINOIS**

Dames and Moore Sample Number	Quant	06FB	G332	G324	02FB	02TB	G303
Laboratory Sample Number	Limit	HA1809	HA1830	HA1831	HA1839	HA1840	HA1836
Sampling Date		11/28/89	11/28/89	11/28/89	11/28/89	11/28/89	12/04/89
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
<b>APPENDIX IX INORGANIC PARAMETERS</b>							
Antimony	60	U	U	U	U	U	U
Arsenic	100	U	180	BMDL J	U	U	15
Barium	20	U	2860	1600	U	U	570
Beryllium	1.0	U	19	4.4	U	U	U
Cadmium	3.0	U	76	17	U	U	U
Calcium	200	BMDL J	910000	647000	250	U	89100
Chromium	10	BMDL J	390	120	BMDL J	U	31
Cobalt	20	U	100	49	U	U	22
Copper	10	U	460	290	U	U	50
Iron	150	U	317000	79500	BMDL J	U	NA
Lead	5.0	U	2000	3700	U	U	153000
Magnesium	100	U	177000	190000	BMDL J	U	0.39
Mercury	0.20	U	1.6	1.7	U	U	0.39
Nickel	20	U	430	230	U	U	26
Potassium	500	U	120000	176000	U	U	71000
Selenium	5.0	UJ	BMDL J	BMDL J	U	U	UJ
Silver	10	U	21 J	11 J	UJ	U	UJ
Sodium	500	U	265000	606000	U	U	231000
Thallium	10	U	BMDL J	UJ	U	U	UJ
Tin	50	U	U	U	U	U	U
Vanadium	20	U	730	160	U	U	33
Zinc	20	190	2900	2050	BMDL J	U	410
<b>CONVENTIONAL PARAMETERS</b>							
Chloride (mg/L)	1.0	U	700	U	U	U	492
Cyanide, (total) (mg/L)	0.01	U	U	U	U	U	U
Sulfate as SO <sub>4</sub> (mg/L)	50	U	26.5	U	U	U	54
Sulfate as S (mg/L)	0.25	U	11.3	U	U	U	1.3

**LEGEND:**

- U Compound was not detected at laboratory method detection limit.
- J Estimated value due to limitations identified during the quality assurance review.
- UJ Reported method detection limit is estimated due to limitations identified during the quality assurance review.
- B Compound was detected in a laboratory and/or field blank at similar concentrations. May represent laboratory and/or field contamination.
- R Unreliable result. Compound may or may not be present.
- \* Sample analyzed at multiple dilutions. Summary table is a hybrid of diluted and undiluted results.
- No standard available. Compound was qualitatively searched for.
- NA Not Analyzed
- NP Not Provided
- IND Indeterminate. Standard and/or spikes could not be detected at method detection limit.
- BMDL Below Method Detection Limit reported by laboratory.

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number		G121S	G302	G302DUP	G317	G305	G318	G337
Laboratory Sample Number		HA1808	HA1815	HA1832	HA1833	HA1834	HA1835	HA1837
Sampling Date	Quant	12/05/89	12/05/89	12/05/89	12/05/89	12/04/89	12/04/89	12/04/89
Dilution Factor	Limit	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
APPENDIX IX HEATED P/T VOLATILE COMPOUNDS								
Acetonitrile	15	U	UJ	25.2 J	U	275	UJ	UJ
Acrolein	20	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Acrylonitrile	10	U	UJ	U	U	U	UJ	UJ
1,4-Dioxane	300	U	UJ	U	U	U	UJ	U
Ethyl cyanide	40	U	UJ	U	U	U	UJ	U
Isobutyl alcohol	230	U	UJ	U	U	U	UJ	U
Methacrylonitrile	110	U	UJ	U	U	U	UJ	UJ

continued next page (or - last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number		G121S	G302	G302DUP	G317	G305	G318	G337
Laboratory Sample Number		HA1808	HA1815	HA1832	HA1833	HA1834	HA1835	HA1837
Sampling Date	Quant	12/05/89	12/05/89	12/05/89	12/05/89	12/04/89	12/04/89	12/04/89
Dilution Factor	Limit	1.0	1.0	1.0	NA	1.0	1.0	1.0
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
APPENDIX IX P/T VOLATILE COMPOUNDS								
Benzene	4.4	245 J	80.4 J	171	NP	U	0.31 J	0.78 J
Methyl bromide	4.7	UJ	UJ	UJ	NP J	UJ	U	U
Carbon disulfide	10	UJ	UJ	U	NP	U	UJ	UJ
Chloroethane	6.0	UJ	UJ	U	NP	U	U	U
Chlorobenzene	-	57.5 J	26.1 J	27	NP	U	U	U
2-Chloro-1,3-butadiene	3.1	UJ	UJ	U	NP	U	U	U
Chloroform	10	UJ	UJ	U	NP	U	U	U
Methyl chloride	1.6	UJ	UJ	U	NP	U	U	U
3-Chloropropene	10	UJ	UJ	U	NP	U	U	U
1,2-Dibromo-3-chloropropane	2.2	UJ	UJ	U	NP	U	U	U
1,2-Dibromoethane	10	UJ	UJ	U	NP	U	U	U
Dibromoethane	10	UJ	UJ	U	NP	U	U	U
1,4-Dichloro-2-butene	10	UJ	UJ	U	NP	U	U	U
Dichlorodifluoromethane	10	UJ	UJ	U	NP	U	U	U
1,1-Dichloroethane	4.7	UJ	UJ	U	NP	U	U	U
1,2-Dichloroethane	2.8	UJ	UJ	U	NP	U	U	U
1,2-Trans-dichloroethene	1.6	UJ	UJ	U	NP	U	U	U
1,1-Dichloroethene	2.8	UJ	UJ	U	NP	U	U	U
Methylene Chloride	5.0	12.2 JB	9.71 B	7.28 B	NP B	6.57 B	8.32 B	9.37 B
1,2-Dichloropropane	10	UJ	UJ	U	NP	U	U	U
cis-1,3-Dichloropropene	7.2	UJ	UJ	U	NP	U	U	U
trans-1,3-Dichloropropene	10	UJ	UJ	U	NP	U	U	U
Chlorodibromomethane	10	UJ	UJ	U	NP	U	U	U
Dichlorobromomethane	10	UJ	UJ	U	NP	U	U	U
Ethyl methacrylate	10	UJ	UJ	U	NP	U	U	U
Iodomethane	10	UJ	UJ	U	NP	U	U	U
Methyl ethyl ketone	2.8	UJ	UJ	U	NP	U	U	U
Methyl methacrylate	10	UJ	UJ	U	NP	U	U	U
Pentachloroethane	10	UJ	UJ	U	NP	U	U	U
1,1,2,2-Tetrachloroethane	10	UJ	UJ	U	NP	U	U	U
1,1,2,2-Tetrachloroethane	-	UJ	UJ	U	NP	U	U	U
Tetrachloroethene	10	UJ	UJ	U	NP	U	U	U
Carbon tetrachloride	4.1	UJ	UJ	U	NP	U	U	U
Toluene	4.1	6.83 J	39 J	47.3	NP	U	U	U

continued next page (see last page of table for notes)



TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number		G121S	G302	G302DUP	G317	G305	G318	G337
Laboratory Sample Number		HA1808	HA1815	HA1832	HA1833	HA1834	HA1835	HA1837
Sampling Date	Quant	12/05/89	12/05/89	12/05/89	12/05/89	12/04/89	12/04/89	12/04/89
Dilution Factor	Limit	1.0	1.0	1.0	NA	1.0	1.0	1.0
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
APPENDIX IX P/T VOLATILE COMPOUNDS (continued)								
Bromoform	6.0	UJ	UJ	U	NP	U	U	U
1,1,1-Trichloroethane	1.6	UJ	UJ	U	NP	U	U	U
1,1,2-Trichloroethane	3.8	UJ	UJ	U	NP	U	U	U
Trichloroethene	5.0	UJ	UJ	U	NP	U	U	U
Trichlorofluoromethane	10	UJ	UJ	UJ	NP J	UJ	UJ	UJ
1,2,3-Trichloropropane	1.9	UJ	UJ	U	NP	U	U	U
Vinyl Chloride	10	UJ	UJ	U	NP	U	U	U
Acetone	10	UJ	47.1 JB	10.5 B	NP B	13.3 B	10.2 B	53.6 B
Ethylbenzene	7.2	13 J	UJ	U	NP	U	U	U
2-Hexanone	10	UJ	UJ	U	NP	U	U	U
Methyl isobutyl ketone	10	6.02 J	UJ	U	NP	U	U	U
Styrene	10	UJ	UJ	U	NP	U	U	U
Vinyl acetate	10	UJ	UJ	U	NP	U	U	U
m-Xylene	10	UJ	UJ	U	NP	U	U	U
o,p-Xylenes	10	12.1 J	UJ	U	NP	U	U	U

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number		G121S	G302	G302DUP	G317	G305	G318	G337
Laboratory Sample Number		HA1808	HA1815	HA1832	HA1833	HA1834	HA1835	HA1837
Sampling Date	Quant	12/05/89	12/05/89	12/05/89	12/05/89	12/04/89	12/04/89	12/04/89
Dilution Factor	Limit	1.0	1.0	1.0	NA	1.0	1.0	1.0
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
APPENDIX IX SEMIVOLATILE COMPOUNDS								
Acetophenone	17	U	U	U	NP	U	U	U
2-Acetylaminofluorene	17	U	U	U	NP	U	U	U
4-Aminobiphenyl	17	U	U	U	NP	U	U	U
Aniline	17	U	U	U	NP	U	U	U
Aramite	17	U	U	U	NP	U	U	U
Benzo(A)anthracene	13	U	U	U	NP	U	U	U
Benzo(b)fluoranthene	8.0	U	U	U	NP	U	U	U
Benzo(a)pyrene	4.2	U	U	U	NP	U	U	U
Bis(2-Chloroethoxy)methane	8.8	U	U	U	NP	U	U	U
Bis(2-chloroethyl) ether	9.5	U	U	U	NP	U	U	U
Bis(2-chloroisopropyl) ether	9.5	U	U	U	NP	U	U	U
Bis(2-Ethylhexyl)phthalate	17	U	U	U	NP	U	3.26 J	4.1 J
4-Bromophenylphenyl ether	3.2	U	U	U	NP	U	U	U
Butylbenzylphthalate	17	U	U	U	NP	U	U	U
2-sec-Butyl-4,6-dinitrophen	17	U	U	U	NP	U	U	U
p-Chloraniline	17	110	U	U	NP	U	U	U
p-Chloro-m-cresol	5.0	U	U	U	NP	U	U	U
2-Chloranaphthalene	3.2	U	U	U	NP	U	U	U
2-Chlorophenol	5.5	U	5.08 J	5.02	NP	U	U	U
Chrysene	4.2	U	U	U	NP	U	U	U
Acenaphthene	3.2	U	U	U	NP	U	U	U
Acenaphthylene	5.8	U	U	U	NP	U	U	U
Anthracene	3.2	U	U	U	NP	U	U	U
Benzo(ghi)perylene	6.8	U	U	U	NP	U	U	U
Benzo(k)fluoranthene	4.2	U	U	U	NP	U	U	U
Fluorene	3.2	U	U	U	NP	U	U	U
Phenanthrene	9.0	U	U	U	NP	U	U	U
Pyrene	3.2	U	U	U	NP	U	U	U
2-Nitrophenol	6.0	U	U	U	NP	U	U	U
o-Cresol	17	U	U	U	NP	U	U	U
m+p-Cresols	17	U	U	U	NP	U	U	U
Diallate	17	U	U	U	NP	U	U	U
Dibenzo(a,h)anthracene	4.2	U	U	U	NP	U	U	U
Di-n-butyl phthalate	17	U	U	U	NP	U	U	U
1,2-Dichlorobenzene	3.2	7.31	U	U	NP	U	U	U
1,3-Dichlorobenzene	3.2	U	U	U	NP	U	U	U
1,4-Dichlorobenzene	7.3	U	U	U	NP	U	U	U
3,3-Dichlorobenzidine	27.5	U	U	U	NP	U	U	U
2,4-Dichlorophenol	4.5	U	21.5 J	21.3	NP	U	U	U
2,6-Dichlorophenol	17	U	U	U	NP	U	U	U

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number		G121S	G302	G302DUP	G317	G305	G318	G337
Laboratory Sample Number		HA1808	HA1815	HA1832	HA1833	HA1834	HA1835	HA1837
Sampling Date	Quant	12/05/89	12/05/89	12/05/89	12/05/89	12/04/89	12/04/89	12/04/89
Dilution Factor	Limit	1.0	1.0	1.0	NA	1.0	1.0	1.0
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
APPENDIX IX SEMIVOLATILE COMPOUNDS (continued)								
Diethylphthalate	17	U	U	U	NP	U	U	U
p-Dimethylaminoazobenzene	17	U	U	U	NP	U	U	U
7,12-Dimethylbenzo(a)anthra	17	U	U	U	NP	U	U	U
3,3-Dimethylbenzidine	17	UJ	UJ	UJ	NP	UJ	UJ	UJ
a-a-Dimethylphenethylamine	-	U	U	U	NP	U	U	U
2,4-Dimethylphenol	4.5	31	U	U	NP	U	U	U
Dimethyl phthalate	17	U	U	U	NP	U	U	U
m-Dinitrobenzene	17	U	U	U	NP	U	U	U
4,6-Dinitro-0-cresol	40	U	U	U	NP	U	U	U
2,4-Dinitrophenol	70	U	U	U	NP	U	U	U
2,4-Dinitrotoluene	9.5	U	U	U	NP	U	U	U
2,6-Dinitrotoluene	3.2	U	U	U	NP	U	U	U
Di-n-octyl phthalate	17	U	U	U	NP	U	U	U
Diphenylamine	17	U	U	U	NP	U	U	U
N-nitrosodipropylamine	17	U	U	U	NP	U	U	U
Ethyl methanesulfonate	17	U	U	U	NP	U	U	U
Fluoranthene	3.7	U	U	U	NP	U	U	U
Hexachlorobenzene	3.2	U	U	U	NP	U	U	U
Hexachlorobutadiene	1.5	U	U	U	NP	U	U	U
Hexachlorocyclopentadiene	17	U	U	U	NP	U	U	U
Hexachloroethane	2.7	U	U	U	NP	U	U	U
Isodrin	9.8	U	U	U	NP	U	U	U
Hexachlorophene	17	U	U	U	NP	U	U	U
Hexachloropropene	17	U	U	U	NP	U	U	U
Indeno(1,2,3-c,d)pyrene	6.2	U	U	U	NP	U	U	U
Isosafrole	17	U	U	U	NP	U	U	U
Methapyrilene	-	U	U	U	NP	U	U	U
3-Methylcholanthrene	9.2	U	U	U	NP	U	U	U
Methyl methanesulfonate	17	U	U	U	NP	U	U	U
Naphthalene	2.7	6.96	2.36 J	2.44	NP	U	U	U
1,4-Naphthoquinone	17	U	U	U	NP	U	U	U
1-Naphthylami	17	U	U	U	NP	U	U	U
2-Naphthylamine	17	U	U	U	NP	U	U	U
p-Nitroaniline	17	U	U	U	NP	U	U	U
Nitrobenzene	3.2	U	U	U	NP	U	U	U
4-Nitrophenol	4.0	U	U	U	NP	U	U	U
4-Nitroquinoline-N-oxide	-	U	U	U	NP	U	U	U
N-Nitrosodiphenylamine	3.2	U	U	U	NP	U	U	U
N-Nitrosodi-n-butylamine	17	U	U	U	NP	U	U	U
N-Nitrosodiethylamine	17	U	U	U	NP	U	U	U
N-Nitrosodimethylamine	17	U	U	U	NP	U	U	U
N-Nitrosomethylethylamine	17	U	U	U	NP	U	U	U

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number		G121S	G302	G302DUP	G317	G305	G318	G337
Laboratory Sample Number		HA1808	HA1815	HA1832	HA1833	HA1834	HA1835	HA1837
Sampling Date	Quant	12/05/89	12/05/89	12/05/89	12/05/89	12/04/89	12/04/89	12/04/89
Dilution Factor	Limit	1.0	1.0	1.0	NA	1.0	1.0	1.0
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
APPENDIX IX SEMIVOLATILE COMPOUNDS (continued)								
N-Nitrosomorpholine	17	U	U	U	NP	U	U	U
N-Nitrosopiperidine	17	U	U	U	NP	U	U	U
N-Nitrosopyrrolodine	17	U	U	U	NP	U	U	U
5-Nitro-o-toluidine	17	U	U	U	NP	U	U	U
Pentachlorobenzene	17	U	U	U	NP	U	U	U
Pentachloronitrobenzene	17	U	U	U	NP	U	U	U
Pentachlorophenol	6.0	U	U	U	NP	U	U	U
Phenacetin	17	U	U	U	NP	U	U	U
Phenol	2.5	U	24.5 J	16.4	NP	U	U	U
m-phenylenediamine	17	U	U	U	NP	U	U	U
o-phenylenediamine	17	U	U	U	NP	U	U	U
p-phenylenediamine	17	U	U	U	NP	U	U	U
2-Picoline	17	U	U	U	NP	U	U	U
Pronamide	17	U	U	U	NP	U	U	U
Pyridine	17	U	U	U	NP	U	U	U
Safrole	17	U	U	U	NP	U	U	U
1,2,4,5-Tetrachlorobenzene	17	U	U	U	NP	U	U	U
2,3,4,6-Tetrachlorophenol	17	U	U	U	NP	U	U	U
Tetraethyldithiopyrophospha	-	U	U	U	NP	U	U	U
o-Toluidine	17	U	U	U	NP	U	U	U
1,2,4-Trichlorobenzene	3.2	U	U	U	NP	U	U	U
2,4,5-Trichlorophenol	17	U	U	U	NP	U	U	U
2,4,6-Trichlorophenol	4.5	U	U	U	NP	U	U	U
0,0,0-Triethyl phosphorothi	-	U	U	U	NP	U	U	U
sym-Trinitrobenzene	-	U	U	U	NP	U	U	U
Benzyl alcohol	17	U	U	U	NP	U	U	U
Dibenzofuran	17	U	U	U	NP	U	U	U
Isophorone	3.7	U	U	U	NP	U	U	U
2-Methylnaphthalene	17	U	U	U	NP	U	U	U
o-Nitroaniline	17	U	U	U	NP	U	U	U
m-Nitroaniline	17	U	U	U	NP	U	U	U
4-Chlorophenyl phenyl ether	7.0	U	U	U	NP	U	U	U

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number	G121S	G302	G302DUP	G317	G305	G318	G337
Laboratory Sample Number	HA1808	HA1815	HA1832	HA1833	HA1834	HA1835	HA1837
Sampling Date	12/05/89	12/05/89	12/05/89	12/05/89	12/04/89	12/04/89	12/04/89
Units	ng/L (ppt)	ng/L (ppt)	ng/L (ppt)	ng/L (ppt)	ng/L (ppt)	ng/L (ppt)	ng/L (ppt)
PCDD/PCDF							
2,3,7,8-TCDD	R	R	R	R	R	R	R
TCDD	R	R	R	R	R	R	R
PCDD	R	R	R	R	R	R	R
HxCDD	R	R	R	R	R	R	R
2,3,7,8-TCDF	R	R	R	R	R	R	R
TCDF	R	R	R	R	R	R	R
PCDF	R	R	R	R	R	R	R
HxCDF	R	R	R	R	R	R	R

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number		G121S	G302	G302DUP	G317	G305	G318	G337
Laboratory Sample Number		HA1808	HA1815	HA1832	HA1833	HA1834	HA1835	HA1837
Sampling Date	Quant	12/05/89	12/05/89	12/05/89	12/05/89	12/04/89	12/04/89	12/04/89
Dilution Factor	Limit	1.0	1.0	1.0	NA	1.0	1.0	1.0
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
APPENDIX IX PESTICIDE & HERBICIDE COMPOUNDS								
Alpha-BHC	0.05	U	U	U	NP	U	U	U
Chlordane	1.0	U	U	U	NP	U	U	U
Chlorobenzilate	2.5	U	U	U	NP	U	U	U
4,4'-DDD	0.10	U	U	U	NP	U	U	U
4,4'-DDE	0.10	U	U	U	NP	U	U	U
4,4'-DDT	0.10	U	U	U	NP	U	U	U
Dieldrin	0.10	U	U	U	NP	U	U	U
Endosulfan I	0.05	U	U	U	NP	U	U	U
Endosulfan II	0.10	U	U	U	NP	U	U	U
Endosulfan Sulfate	0.10	U	U	U	NP	U	U	U
Endrin	0.10	U	U	U	NP	U	U	U
Endrin Aldehyde	0.10	U	U	U	NP	U	U	U
Hepatchlor	0.05	U	U	U	NP	U	U	U
Hepatchlor Epoxide	0.05	U	U	U	NP	U	U	U
Beta-BHC	0.05	U	U	U	NP	U	U	U
Delta-BHC	0.05	U	U	U	NP	U	U	U
Gamma-BHC (Lindane)	0.05	U	U	U	NP	U	U	U
Kepone	0.55	U	U	U	NP	U	U	U
Methoxychlor	0.55	U	U	U	NP	U	U	U
Toxaphene	2.0	U	U	U	NP	U	U	U
Arochlor-1016	0.50	U	U	U	NP	U	U	U
Arochlor-1221	0.50	U	U	U	NP	U	U	U
Arochlor-1232	0.50	U	U	U	NP	U	U	U
Arochlor-1242	0.50	U	U	U	NP	U	U	U
Arochlor-1248	0.50	U	U	U	NP	U	U	U
Arochlor-1254	1.0	U	U	U	NP	U	U	U
Arochlor-1260	1.0	U	U	U	NP	U	U	U
Thionazin	1.0	U	U	U	NP	U	U	U
Dimethoate	2.5	U	U	U	NP	U	U	U
Disulfoton	0.55	U	U	U	NP	U	U	U
Methyl parathion	1.0	U	U	U	NP	U	U	U
Parathion	1.0	U	U	U	NP	U	U	U
Phorate	2.5	U	U	U	NP	U	U	U
Famphur	10	U	U	U	NP	U	U	U
2,4-D	3.8	U	U	U	NP	U	U	U
2,4,5-T	0.76	U	U	U	NP	U	U	U
2,4,5-TP (Silvex)	0.76	U	U	U	NP	U	U	U

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE I INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number Laboratory Sample Number Sampling Date Units	Quant Limit ug/L	G121S HA1808 12/05/89 ug/L	G302 HA1815 12/05/89 ug/L	G302DUP HA1832 12/05/89 ug/L	G317 HA1833 12/05/89 ug/L	G305 HA1834 12/04/89 ug/L	G318 HA1835 12/04/89 ug/L	G337 HA1837 12/04/89 ug/L
<b>APPENDIX IX INORGANIC PARAMETERS</b>								
Antimony	60	U	99 J	83	BMDL J	U	BMDL J	BMDL J
Arsenic	100	19 J	150 J	96	17	16	78	56
Barium	20	140	1200	1100	2010	130	510	570
Beryllium	1.0	U	15 J	13	1.1	BMDL J	3.7	4.1
Cadmium	3.0	2.5	60 J	54	4.6	BMDL J	10	11
Calcium	200	338000	3990000 J	3650000	1150000	384000	404000	434000
Chromium	10	100	370 J	320	170	30	140	150
Cobalt	20	U	90 J	75	BMDL J	24	91	96
Copper	10	BMDL J	510 J	430	200	46	160	240
Iron	150	NA	NA	NA	NA	NA	NA	NA
Lead	5.0	9.3 J	2400 J	2000	830	57	350	490
Magnesium	100	163000	1560000 J	1390000	46600	129000	180000	155000
Mercury	0.20	U	0.33	0.27	1	BMDL J	0.39	0.85
Nickel	20	30	270 J	230	110	31	160	180
Potassium	500	U	104000	107000	125000	22000	36000	50100
Selenium	5.0	UJ	BMDL J	BMDL J	U	UJ	UJ	UJ
Silver	10	U	46 J	44 J	BMDL J	UJ	BMDL J	BMDL J
Sodium	500	5010000	208000	228000 J	122000	93900	82400	139000
Thallium	10	UJ	UJ	BMDL J	UJ	UJ	UJ	U
Tin	50	U	UJ	U	BMDL J	U	U	U
Vanadium	20	21	340 J	290	170	39	160	180
Zinc	20	23	2000 J	1600	1000	120	390	600
<b>CONVENTIONAL PARAMETERS</b>								
Chloride (mg/L)	1.0	9030	531	537	NP	NA	294	476
Cyanide, (total) (mg/L)	0.01	U	U	U	NP	U	U	U
Sulfate as SO4 (mg/L)	50	470	194	207	NP	NA	195	552
Sulfate as S (mg/L)	0.25	0.48	U	U	NP	NA	0.62	1

**LEGEND:**

- U Compound was not detected at laboratory method detection limit.
- J Estimated value due to limitations identified during the quality assurance review.
- UJ Reported method detection limit is estimated due to limitations identified during the quality assurance review.
- B Compound was detected in a laboratory and/or field blank at similar concentrations. May represent laboratory and/or field contamination.
- R Unreliable result. Compound may or may not be present.
- \* Sample analyzed at multiple dilutions. Summary table is a hybrid of diluted and undiluted results.
- No standard available. Compound was qualitatively searched for.
- NA Not Analyzed
- NP Not Provided
- IND Indeterminate. Standard and/or spikes could not be detected at method detection limit.
- BMDL Below Method Detection Limit reported by laboratory.



**CWM CHEMICAL SERVICES, INC.**

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**CHICAGO INCINERATOR FACILITY**  
CHICAGO, ILLINOIS

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**FINAL  
RCRA FACILITY INVESTIGATION  
REPORT**

**APPENDICES N - P**

**PART 2 OF  
VOLUME 3 OF 5  
FEBRUARY 1995**

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**PHASE II**  
**DATA VALIDATION REPORTS**

**- APPENDIX N -**



**DATA VALIDATION/QUALITY ASSURANCE REVIEW  
PHASE II RCRA FACILITY INVESTIGATION  
CHEM WASTE MANAGEMENT, INC. - CHICAGO INCINERATOR  
SAMPLE COLLECTION DATES: SEPTEMBER 25 and SEPTEMBER 30, 1991  
DAMES & MOORE JOB NO.: 13963-055-192**

**LABORATORY REPORT Nos.: 101341 & 101346**

**INTRODUCTION**

Six (6) soil samples and two (2) trip-blank samples were collected and submitted to Environmental Testing Corporation (ETC) of Edison, New Jersey (1992 Illinois Certification No. 100224). All samples included in the review are listed on Table 1. All soil samples were analyzed for RCRA Appendix IX heated purge and trap (HP/T) volatile organic compounds, purge and trap (P/T) volatile organic compounds, semivolatile organic compounds (base/neutral and acid-extractable organic compounds) and metals. The trip-blank samples were analyzed for RCRA Appendix IX HP/T and P/T volatile organic compounds only. All samples were analyzed following USEPA SW-846 Methodologies.

A data validation review was performed on all samples prepared under a modified CLP-SOW 3/90 CLP-I data deliverable format. Data were examined to assess the usability of the results, as well as to assess the compliance relative to data package deliverable requirements. The organic data review is based upon a rigorous review of the reported hold times, surrogate recoveries, blank spike recoveries, matrix spike and matrix spike duplicate summaries, blank contaminants, internal standard area performance, Gas Chromatography/Mass Spectroscopy (GC/MS) tuning and calibration data.

The inorganic data review is based on a review of the reported hold times, blank analysis results, blank spike recoveries, matrix spike and duplicate results, calibration results, post-digestion spike recoveries and Inductively Coupled Plasma (ICP) serial dilution analysis.

Details of the data validation/quality assurance review are presented in the narrative section of the report. The data is summarized in Table 2 of the report. Data qualifiers have been placed next to the results so that the data user can quickly assess the qualitative and/or quantitative reliability of the reported result. This report was prepared to provide a critical review of the laboratory analysis and reported chemical results. Quality assurance reviews of laboratory-generated data routinely identify problems associated with analytical measurements, even from the most experienced and capable laboratories.

This review has been performed in accordance with the requirements specified in the "Laboratory Data Validation Functional Guidelines for Evaluating Organic Analyses" dated February 1988 and "Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses" dated July 1988.

**TABLE 1**  
**SAMPLES INCLUDED IN REVIEW**

<u>Sample ID</u>	<u>Lab ID</u>	<u>Date Collected</u>	<u>Test Requested</u>
<u>Log Link No. 101341</u>			
C-4-5	HA6084	09/25/91	RCRA Appendix IX HP/T VOA, P/T VOA, BNA & Metals
C-4-15	HA6085	09/25/91	RCRA Appendix IX HP/T VOA, P/T VOA, BNA & Metals
C-4-40	HA6086	09/25/91	RCRA Appendix IX HP/T VOA, P/T VOA, BNA & Metals
TB-092591	HA6109	09/25/91	RCRA Appendix IX HP/T VOA & P/T VOA
<u>Log Link No. 101346</u>			
C-6-5	HA6090	09/30/91	RCRA Appendix IX HP/T VOA, P/T VOA, BNA & Metals
C-6-15	HA6091	09/30/91	RCRA Appendix IX HP/T VOA, P/T VOA, BNA & Metals
C-6-40	HA6092	09/30/91	RCRA Appendix IX HP/T VOA, P/T VOA, BNA & Metals
TB-093091	HA6110	09/30/91	RCRA Appendix IX HP/T VOA & P/T VOA

Legend:

HP/T = Heated Purge and Trap  
P/T = Purge and Trap  
VOA = Volatile Organics Compounds  
BNA = Semivolatile Organics Compounds (Base/Neutral and Acid-Extractable Organics)

## GENERAL COMMENTS

With regard to the data package deliverables, most of the requirements were met with the exception of the metals fraction. This reviewer has observed that for the ICP positive concentrations reported at 10 to 15 times above the method detection limit (MDL), the data validation cannot reproduce the laboratory reported results. The calculation obtained during data validation is consistently higher than the laboratory reported concentration. This is due to the fact that the interelement correction factors in the ICP instrument have been externally calculated in the system. Since this external interelement correction factor is not available for review, the reported results for low level samples cannot be reproduced. It should be noted that positive ICP reported results that are significantly above than the MDL (approximately 100 times higher or more) were reproduced and validated, since this interelement correction factor becomes negligible at higher concentrations. It is this reviewer's opinion that data usability is not impacted. The data review assumes that the low level reported concentrations (10 to 15 times the MDL) are correct as reported.

## DATA QUALIFIERS

Overall, the data quality is good. The data validation review has identified aspects of the analytical data that require qualification. To confidently use any of the data within the data set, the data user should understand the limitations and qualifications presented. With regard to data usability, the following qualifiers are offered based upon the data provided.

### ORGANIC QUALIFIERS

#### Hold Times:

- All samples were analyzed and/or extracted within the required hold time criteria for all organic parameters.

#### Blank Contamination:

- Due to the presence of toluene in the purge and trap (P/T) volatile laboratory blank associated with samples C-4-5 and C-4-40, the positive results of this compound are qualitatively questionable and have been flagged (B) on the summary tables.

#### Surrogate Recoveries:

- The (P/T) volatile surrogates, toluene-d8, bromofluorobenzene (BFB) and 1,2-dichloroethane-d4 (DCA), were recovered outside the control limits (high for toluene-d8 and low for BFB and DCA) for sample C-4-

15. This sample was reanalyzed with both toluene and DCA outside the control limits (high for toluene-d8 and low for DCA), which may indicate matrix effects. The results of the initial analysis were reported by the laboratory and are deemed usable. Due to the variability of the surrogate recoveries, the positive and non-detected results are regarded as estimated values and have been flagged (J/UJ) estimated on the summary tables.

- The P/T volatile surrogate, toluene-d8, was recovered outside the control limits (high) for sample C-6-40. The sample was reanalyzed with this surrogate recovered outside the control limits (high) which may indicate matrix effects. The results of the initial analysis were reported by the laboratory and are deemed usable. The positive results in this sample may be biased high and have been flagged (J) estimated on the summary tables.
- The P/T volatile surrogate, DCA, was recovered outside the control limits (low) for samples C-4-5 and C-4-40. These samples were reanalyzed with DCA recovered outside the control limits (low) for sample C-4-5 and BFB outside the control limits (low) for sample C-4-40. The results of the initial analysis for both samples were reported by the laboratory and are deemed usable. The positive and non-detected compounds in both samples may be biased low and have been flagged (J/UJ) estimated on the summary tables.

#### Internal Standard Area Counts:

- The area count of the semivolatile internal standard, phenanthrene-d10, was outside the control limits for sample C-6-40. The positive and non-detected compounds quantitated against this internal standard are regarded as estimated values and have been flagged (J/UJ) on the summary tables.

#### Matrix Spike and Matrix Spike Duplicate Summary (MS/MSD):

- The blank spike recovery of the heated purge and trap (HP/T) volatile compound, acrylonitrile, was outside the control limits (low). The non-detected results of this compound for all field samples may be biased low and have been flagged (UJ) estimated.
- The HP/T volatile blank spike recoveries of acrolein and ethylcyanide, associated with all field samples, were outside the control limits (high) and may be biased high. No qualifier has been applied since these compounds were non-detected for all field samples.

- The P/T volatile blank spike recovery of 3-chloropropene, associated with samples C-4-5, C-4-15 and C-4-40, was outside the control limits (low). The non-detected result of this compound for these samples may be biased low and have been flagged (UJ) estimated on the summary tables.
- Due to the low blank spike recoveries of the P/T volatile compounds, methyl bromide, carbon disulfide, chloroethane, dichlorodifluoromethane, methylene chloride, trans-1,3-dichloropropylene, iodomethane, methyl ethyl ketone (MEK), toluene, vinyl chloride, acetone, ethyl benzene, styrene, m-xylene and o&p-xylenes, associated with samples C-6-5 and C-6-15, the positive and non-detected results of these compounds may be biased low and have been flagged (J/UJ) estimated on the summary tables.
- The base/neutral blank spike recoveries of aniline, bis(2-chloroisopropyl) ether, bis(2-chloroethyl) ether, o-cresol, diethyl phthalate and n-nitroso-di-n-propylamine, associated with all field samples, were recovered outside the control limits (low). The positive and non-detected results of these compounds may be biased low and have been flagged (J/UJ) estimated on the summary tables.

#### Initial and Continuing Calibrations:

- Due to the high difference between the initial and continuing calibration response factors of the HP/T volatile compounds, isobutyl alcohol, acrolein and acrylonitrile, associated with the trip-blank samples, TB-092591 and TB-093091, the non-detected results of these compounds may be higher than reported and have been flagged (UJ) estimated on the summary tables

#### Additional Comments:

- As per the requirements, all values calculated below the method detection limit should be considered estimated and have been flagged (J) on the summary tables.

#### INORGANICS PARAMETER QUALIFIERS

##### Hold Times:

- All samples were digested and analyzed within the required hold time criteria for the metals analyses.



#### Blank Contamination:

- No blank contaminants have been identified that require qualification on the metal analytes for the samples reviewed.

#### Instrument Calibration and Verification:

- The initial and continuing calibration verification recoveries of all metals were reported within control limits.

#### ICP Serial Dilution:

- The ICP serial dilution analyses of nickel and zinc associated with sample C-6-15 are outside the control limits. The positive results of these analytes for the sample have been flagged (J) estimated on the summary table.

#### Matrix Spike and Duplicate Summary:

- Due to the low spike recoveries of zinc and selenium in sample C-6-15, the positive and non-detected results of these analytes in the unspiked sample may be biased low have been flagged (J/UJ) estimated.

#### Post-Digestion Spike Recoveries:

- The post-spike recoveries of the following analytes were recovered outside the control limits (low). The positive and/or non-detected results of these analytes for the associated samples may be biased low and have been flagged (J) estimated.

<u>Analyte</u>	<u>Log Link No.</u>	<u>Associated Sample</u>
Selenium	101341	C-4-5 & C-4-15
	101346	C-4-40, C-6-5, & C-6-40
Thallium	101341	C-4-5 & C-4-40
	101346	C-6-40

#### Additional Comments:

- The laboratory reports several inorganic results as below the method detection limit (BMDL). These are reported as BMDL on Table 2. The actual concentrations were not calculated during the data validation review since the interelement coefficient factors were not provided.

TABLE 2  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number			SC-4-5	SC-6-5	SC-4-40	SC-4-15	SC-6-15	SC-6-40	TB910925	TB910930
Sample Depth (ft)			22-24	20-22	56-58	32-34	30-32	54-56	NA	NA
Laboratory Sample Number			HA6084	HA6090	HA6086	HA6085	HA6091	HA6092	HA6109	HA6110
Sampling Date	Quant	Quant	9/25/91	9/30/91	9/25/91	9/25/91	9/30/91	9/30/91	9/25/91	9/30/91
Dilution Factor	Limit	Limit	1.2	1.2	1.1	1.3	1.2	1.1	1.0	1.0
Units	ug/L	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/L	ug/L
HEATED P/T VOLATILE COMPOUNDS										
Acetonitrile	15	15	U	U	U	U	U	U	U	U
Acrolein	20	20	U	U	U	U	U	U	UJ	UJ
Acrylonitrile	10	10	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
1,4-Dioxane	300	300	U	U	U	U	U	U	U	U
Ethyl cyanide	40	40	U	U	U	U	U	U	U	U
Isobutyl alcohol	230	230	U	U	U	U	U	U	UJ	UJ
Methacrylonitrile	110	110	U	U	U	U	U	U	U	U

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number			SC-4-5	SC-6-5	SC-4-40	SC-4-15	SC-6-15	SC-6-40	TB910925	TB910930
Sample Depth (ft)			22-24	20-22	56-58	32-34	30-32	54-56	NA	NA
Laboratory Sample Number			HA6084	HA6090	HA6086	HA6085	HA6091	HA6092	HA6109	HA6110
Sampling Date			9/25/91	9/30/91	9/25/91	9/25/91	9/30/91	9/30/91	9/25/91	9/30/91
Dilution Factor			1.2	1.2	1.1	1.3	1.2	1.1	1.0	1.0
Units	Quant Limit ug/L	Quant Limit ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/L	ug/L
<b>VOLATILE COMPOUNDS</b>										
Acetone	10	10	UJ	UJ	UJ	UJ	UJ	U	3.0 J	U
Benzene	4.4	4.4	1.2 J	U	UJ	2.9 J	U	U	U	U
Bromoform	4.7	4.7	UJ	U	UJ	UJ	U	U	U	U
Carbon disulfide	10	10	UJ	UJ	UJ	UJ	UJ	U	U	U
Carbon Tetrachloride	2.8	2.8	UJ	U	UJ	UJ	U	U	U	U
Chlorobenzene	6.0	6.0	UJ	U	UJ	UJ	U	U	U	U
2-Chloro-1,3-butadiene	-	-	UJ	U	UJ	UJ	U	U	U	U
Chlorodibromomethane	3.1	3.1	UJ	U	UJ	UJ	U	U	U	U
3-Chloropropene	10	10	UJ	U	UJ	UJ	U	U	U	U
Chloroethane	10	10	UJ	UJ	UJ	UJ	UJ	U	U	U
Chloroform	1.6	1.6	UJ	U	UJ	UJ	U	U	U	U
Dichlorobromomethane	2.2	2.2	UJ	U	UJ	UJ	U	U	U	U
Dichlorodifluoromethane	10	10	UJ	UJ	UJ	UJ	UJ	U	U	U
1,2-Dibromo-3-chloropropane	10	10	UJ	U	UJ	UJ	U	U	U	U
1,2-Dibromoethane	10	10	UJ	U	UJ	UJ	U	U	U	U
1,4-Dichloro-2-butene	10	10	UJ	U	UJ	UJ	U	U	U	U
Dichlorodifluoromethane	10	10	UJ	U	UJ	UJ	U	U	U	U
1,1-Dichloroethane	4.7	4.7	UJ	U	UJ	UJ	U	U	U	U
1,2-Dichloroethane	2.8	2.8	UJ	U	UJ	UJ	U	U	U	U
1,1-Dichloroethene	2.8	2.8	UJ	U	UJ	UJ	U	U	U	U
1,2-Dichloropropane	6.0	6.0	UJ	U	UJ	UJ	U	U	U	U
cis-1,3-Dichloropropene	5.0	5.0	UJ	U	UJ	UJ	U	U	U	U
trans-1,3-Dichloropropene	10	10	UJ	UJ	UJ	UJ	UJ	U	U	U
Ethylbenzene	7.2	7.2	UJ	UJ	UJ	UJ	UJ	U	U	U
Ethyl methacrylate	10	10	UJ	U	UJ	UJ	U	U	U	U
2-Hexanone	10	10	UJ	U	UJ	UJ	U	U	U	U
Iodomethane	10	10	UJ	UJ	UJ	UJ	UJ	U	U	U
Methyl bromide	10	10	UJ	UJ	UJ	UJ	UJ	U	U	U
Methyl chloride	10	10	UJ	U	UJ	UJ	U	U	U	U
Methylene Chloride	2.8	2.8	UJ	UJ	UJ	UJ	UJ	U	U	U
Methyl isobutyl ketone	10	10	UJ	U	UJ	UJ	U	U	U	U
Methyl ethyl ketone	10	10	UJ	UJ	13	UJ	UJ	U	U	U
Methyl methacrylate	10	10	UJ	U	UJ	UJ	U	U	U	U
Pentachloroethane	-	-	UJ	U	UJ	UJ	U	U	U	U

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number			SC-4-5	SC-6-5	SC-4-40	SC-4-15	SC-6-15	SC-6-40	TB910925	TB910930
Sample Depth (ft)			22-24	20-22	56-58	32-34	30-32	54-56	NA	NA
Laboratory Sample Number			HA6084	HA6090	HA6086	HA6085	HA6091	HA6092	HA6109	HA6110
Sampling Date			9/25/91	9/30/91	9/25/91	9/25/91	9/30/91	9/30/91	9/25/91	9/30/91
Dilution Factor	Quant	Quant	1.2	1.2	1.1	1.3	1.2	1.1	1.0	1.0
Units	Limit	Limit	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/L	ug/L
VOLATILE COMPOUNDS (Continued)										
Styrene	10	10	UJ	UJ	UJ	UJ	UJ	U	U	U
1,1,2,2-Tetrachloroethane	4.1	4.1	UJ	U	UJ	UJ	U	U	U	U
Tetrachloroethene	4.1	4.1	UJ	U	UJ	UJ	U	U	U	U
Toluene	6.0	6.0	3.3 JB	UJ	4.1 JB	8.72 J	UJ	U	U	U
1,2-Dichloroethene (trans)	1.6	1.6	UJ	U	UJ	UJ	U	U	U	U
1,1,1-Trichloroethane	3.8	3.8	UJ	U	UJ	UJ	U	U	U	U
1,1,2-Trichloroethane	5.0	5.0	UJ	U	UJ	UJ	U	U	U	U
1,2,3-Trichloropropane	10	10	UJ	U	UJ	UJ	U	U	U	U
Trichloroethene	1.9	1.9	1.3 J	U	UJ	2.1 J	U	U	U	U
Trichlorofluoromethane	10	10	UJ	U	UJ	UJ	7.9 J	19.3 J	U	U
Vinyl acetate	10	10	UJ	U	UJ	UJ	U	U	U	U
Vinyl Chloride	10	10	UJ	UJ	UJ	UJ	UJ	U	U	U
m-Xylene	10	10	UJ	UJ	UJ	UJ	UJ	U	U	U
o,p-Xylenes	10	10	UJ	UJ	UJ	UJ	UJ	U	U	U

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number			SC-4-5	SC-6-5	SC-4-40	SC-4-15	SC-6-15	SC-6-40
Sample Depth (ft)			22-24	20-22	56-58	32-34	30-32	54-56
Laboratory Sample Number			HA6084	HA6090	HA6086	HA6085	HA6091	HA6092
Sampling Date			9/25/91	9/30/91	9/25/91	9/25/91	9/30/91	9/30/91
Dilution Factor			1.2	1.2	1.1	1.3	1.2	1.1
Units	Quant ug/L	Quant ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
APPENDIX IX SEMIVOLATILE COMPOUNDS								
Acetophenone	10	1000	U	U	U	U	U	U
2-Acetylaminofluorene	10	1000	U	U	U	U	U	U
4-Aminobiopheny	10	1000	U	U	U	U	U	U
Aniline	10	1000	UJ	UJ	UJ	UJ	UJ	UJ
Aramite	10	1000	U	U	U	U	U	U
Benzo(A)anthracene	8.0	790	U	U	U	U	U	U
Benzo(b)fluoranthene	4.9	490	U	U	U	U	U	U
Benzo(a)pyrene	2.6	250	U	U	U	U	U	U
Bis(2-Chloroethoxy)methane	5.5	540	U	U	U	U	U	U
Bis(2-chloroethyl) ether	5.9	580	UJ	UJ	UJ	UJ	UJ	UJ
Bis(2-chloroisopropyl)ether	5.9	580	UJ	UJ	UJ	UJ	UJ	UJ
Bis(2-Ethylhexyl)phthalate	10	1000	41500	U	U	U	U	U
4-Bromophenylphenyl ether	2.0	190	U	U	U	U	U	UJ
Butylbenzylphthalate	10	1000	U	U	U	U	U	U
2-sec-Butyl-4,6-dinitrophen	10	1000	U	U	U	U	U	UJ
p-Chloraniline	10	1000	U	U	U	U	U	U
p-Chloro-m-cresol	3.1	300	U	U	U	U	U	U
2-Chloranaphthalene	2.0	190	U	U	U	U	U	U
2-Chlorophenol	3.4	330	U	U	U	U	U	U
Chrysene	2.6	250	U	U	U	U	U	U
Acenaphthene	2.0	190	U	U	U	U	U	U
Acenaphthylene	3.6	350	U	U	U	U	U	U
Anthracene	2.0	190	U	U	U	U	U	UJ
Benzo(ghi)perylene	3.2	415	U	U	U	U	U	U
Benzo(k)fluoranthene	2.6	250	U	U	U	U	U	U
Fluorene	2.0	190	U	U	U	U	U	U
Phenanthrene	5.6	550	U	U	345 J	U	U	UJ
Pyrene	2.0	190	U	U	U	U	U	UJ
2-Nitrophenol	3.7	365	U	U	U	U	U	U
o-Cresol	10	1000	UJ	UJ	UJ	UJ	UJ	UJ
m+p-Cresols	10	1000	U	U	U	U	U	U
Diallate	10	1000	U	U	U	U	U	UJ
Dibenzo(a,h)anthracene	2.6	250	U	U	U	U	U	U
Di-N-butyl phthalate	10	1000	6910	4660	4460	4090	2840	2020 J
1,2-Dichlorobenzene	2.0	190	U	U	U	U	U	U
1,3-Dichlorobenzene	2.0	190	U	U	U	U	U	U
1,4-Dichlorobenzene	4.5	450	U	U	U	U	U	U
3,3-Dichlorobenzidine	17	1675	U	U	U	U	U	U
2,4-Dichlorophenol	2.8	275	U	U	U	U	U	U
2,6-Dichlorophenol	10	1000	U	U	U	U	U	U

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number			SC-4-5	SC-6-5	SC-4-40	SC-4-15	SC-6-15	SC-6-40
Sample Depth (ft)			22-24	20-22	56-58	32-34	30-32	54-56
Laboratory Sample Number			HA6084	HA6090	HA6086	HA6085	HA6091	HA6092
Sampling Date	Quant	Quant	9/25/91	9/30/91	9/25/91	9/25/91	9/30/91	9/30/91
Dilution Factor	Limit	Limit	1.2	1.2	1.1	1.3	1.2	1.1
Units	ug/L	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
APPENDIX IX SEMIVOLATILE COMPOUNDS (Continued)								
Diethyl-phthalate	10	1000	UJ	UJ	UJ	UJ	UJ	UJ
p-Dimethylaminoazobenzene	10	1000	U	U	U	U	U	U
7,12-Dimethylbenzo(a)anthra	10	1000	U	U	U	U	U	U
3,3-Dimethylbenzidine	10	1000	U	U	U	U	U	U
a-a-Dimethylphenethylamine	-	-	-	-	-	-	-	-
2,4-Dimethylphenol	2.8	275	U	U	U	U	U	U
Dimethyl phthalate	10	1000	U	U	U	U	U	U
m-Dinitrobenzene	10	1000	U	U	U	U	U	U
4,6-Dinitro-O-cresol	25	2400	U	U	U	U	U	UJ
2,4-Dinitrophenol	43	4250	U	U	U	U	U	U
2,4-Dinitrotoluene	5.9	580	U	U	U	U	U	U
2,6-Dinitrotoluene	2.0	190	U	U	U	U	U	U
Di-n-octyl phthalate	10	1000	U	U	U	U	U	U
Diphenylamine	10	1000	U	U	U	U	U	UJ
N-nitrosodipropylamine	10	1000	UJ	UJ	UJ	UJ	UJ	UJ
Ethyl methanesulfonate	10	1000	U	U	U	U	U	U
Fluoranthene	2.3	225	U	U	U	U	U	UJ
Hexachlorobenzene	2.0	190	U	U	U	U	U	UJ
Hexachlorobutadiene	0.93	90	U	U	U	U	U	U
Hexachlorocyclopentadiene	10	1000	U	U	U	U	U	U
Hexachloroethane	1.6	165	U	U	U	U	U	U
Isodrin	6.1	1000	U	U	U	U	U	UJ
Hexachlorophene	10	1000	U	U	U	U	U	UJ
Hexachloropropene	10	1000	U	U	U	U	U	U
Indeno(1,2,3-c,d)pyrene	3.8	365	U	U	U	U	U	U
Isosafrole	10	600	U	U	U	U	U	U
Methapyrene	-	-	IND	IND	IND	IND	IND	IND
3-Methylcholanthrene	5.7	555	U	U	U	U	U	U
Methyl methanesulfonate	10	1000	U	U	U	U	U	U
Naphthalene	1.6	165	U	U	U	U	U	U
1,4-Naphthoquinone	10	1000	U	U	U	U	U	U
1-Naphthylamine	10	1000	U	U	U	U	U	U
2-Naphthylamine	10	1000	U	U	U	U	U	U
p-Nitroaniline	10	1000	U	U	U	U	U	U
Nitrobenzene	2.0	190	U	U	U	U	U	U
4-Nitrophenol	2.5	240	U	U	U	U	U	U
4-Nitroquinoline-N-oxide	-	-	IND	IND	IND	IND	IND	IND
N-Nitrosodiphenylamine	2.0	190	U	U	U	U	U	UJ
N-Nitrosodi-n-butylamine	10	1000	U	U	U	U	U	U
N-Nitrosodiethylamine	10	1000	U	U	U	U	U	U
N-Nitrosodimethylamine	10	1000	U	U	U	U	U	U
N-Nitrosomethylethylamine	10	1000	U	U	U	U	U	U

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number			SC-4-5	SC-6-5	SC-4-40	SC-4-15	SC-6-15	SC-6-40
Sample Depth (ft)			22-24	20-22	56-58	32-34	30-32	54-56
Laboratory Sample Number			HA6084	HA6090	HA6086	HA6085	HA6091	HA6092
Sampling Date			9/25/91	9/30/91	9/25/91	9/25/91	9/30/91	9/30/91
Dilution Factor			1.2	1.2	1.1	1.3	1.2	1.1
Units	Quant Limit ug/L	Quant Limit ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
APPENDIX IX SEMIVOLATILE COMPOUNDS (Continued)								
N-Nitrosomorpholine	10	1000	U	U	U	U	U	U
N-Nitrosopiperidine	10	1000	U	U	U	U	U	U
N-Nitrosopyrrolidine	10	1000	U	U	U	U	U	U
5-Nitro-o-toluidine	10	1000	U	U	U	U	U	U
Pentachlorobenzene	10	1000	U	U	U	U	U	U
Pentachloronitrobenzene	10	1000	U	U	U	U	U	U
Pentachlorophenol	3.7	365	U	U	U	U	U	U
Phenacetin	10	1000	U	U	U	U	U	U
Phenol	1.5	150	U	U	U	U	U	U
m-phenylenediamine	10	1000	U	U	U	U	U	U
o-phenylenediamine	10	1000	U	U	U	U	U	U
p-phenylenediamine	10	1000	U	U	U	U	U	U
2-Picoline	10	1000	U	U	U	U	U	U
Pronamide	10	1000	U	U	U	U	U	U
Pyridine	10	1000	U	U	U	U	U	U
Safrole	10	1000	U	U	U	U	U	U
1,2,4,5-Tetrachlorobenzene	10	1000	U	U	U	U	U	U
2,3,4,6-Tetrachlorophenol	10	1000	U	U	U	U	U	U
Tetraethyldithiopyrophospha	-	-	U	U	U	U	U	U
o-Toluidine	10	1000	U	U	U	U	U	U
1,2,4-Trichlorobenzene	2.0	190	U	U	U	U	U	U
2,4,5-Trichlorophenol	10	1000	U	U	U	U	U	U
2,4,6-Trichlorophenol	2.8	275	U	U	U	U	U	U
0,0,0-Triethyl phosphorothi	-	-	-	-	-	-	-	-
sym-Trinitrobenzene	-	-	IND	IND	IND	IND	IND	IND
Benzyl alcohol	10	1000	U	U	U	U	U	U
Dibenzofuran	10	1000	U	U	U	U	U	U
Isophorone	2.3	225	U	U	U	U	U	U
2-Methylnaphthalene	10	1000	U	260 J	450 J	U	U	U
o-Nitroaniline	10	1000	U	U	U	U	U	U
m-Nitroaniline	10	1000	U	U	U	U	U	U
4-Chlorophenyl phenyl ether	4.3	425	U	U	U	U	U	U

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TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number			SC-4-5	SC-6-5	SC-4-40	SC-4-15	SC-6-15	SC-6-40
Sample Depth (ft)			22-24	20-22	56-58	32-34	30-32	54-56
Laboratory Sample Number			HA6084	HA6090	HA6086	HA6085	HA6091	HA6092
Sampling Date			9/25/91	9/30/91	9/25/91	9/25/91	9/30/91	9/30/91
Units	Quant Limit ug/L	Quant Limit ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
<b>INORGANIC PARAMETERS</b>								
Antimony	60	6000	U	U	U	U	U	U
Arsenic	10	1000	6500	9600	11000	16000	16000	11000
Barium	20	2000	50000	48000	27000	13000	12000	23000
Beryllium	1.0	100	690	660	630	380	410	570
Cadmium	2.0	200	3100	3300	3400	3400	3700	3400
Chromium	10	1000	18000	17000	15000	8600	8800	14000
Cobalt	20	2000	9200	13000	12000	13000	12000	12000
Copper	10	1000	21000	32000	29000	42000	48000	34000
Lead	5.0	500	10000	16000	31000	24000	23000	16000
Mercury	0.20	80	U	U	U	U	U	U
Nickel	20	1000	25000	34000	31000	29000	28000 J	30000
Selenium	5.0	500	BMDL J	BMDL J	BMDL J	BMDL J	BMDL J	BMDL J
Silver	10	1000	U	U	BMDL	U	BMDL	BMDL
Thallium	10	1000	UJ	BMDL	BMDL J	BMDL	BMDL	BMDL J
Tin	50	5000	35000	33000	32000	27000	32000	33000
Vanadium	20	2000	21000	22000	19000	13000	14000	18000
Zinc	20	2000	45000	63000	59000	50000	81000 J	55000

**LEGEND:**

U Compound was not detected at laboratory method detection limit.

J Estimated value due to limitations identified during the quality assurance review.

UJ Reported method detection limit is estimated due to limitations identified during the quality assurance review.

B Compound was detected in a laboratory and/or field blank at similar concentrations. May represent laboratory and/or field contamination.

- No standard available. Compound was qualitatively searched for.

IND Indeterminate. Standard and/or spikes could not be detected at method detection limit.

Discrepancies may exist between the laboratory data tables and the data validation summary tables due to variations in the rounding of calculations.





**DATA VALIDATION/QUALITY ASSURANCE REVIEW  
PHASE II RCRA FACILITY INVESTIGATION  
CHEM WASTE MANAGEMENT, INC. - CHICAGO INCINERATOR  
SAMPLE COLLECTION DATES: OCTOBER 2 - OCTOBER 3, 1991  
DAMES & MOORE JOB NO.: 13963-055-192**

**LABORATORY REPORT Nos.: 101353, 101357 & 101362**

**INTRODUCTION**

Fourteen (14) soil samples, plus two (2) field-duplicate samples, one (1) field-blank sample and two (2) trip-blank samples were collected and submitted to Environmental Testing Corporation (ETC) of Edison, New Jersey (1992 Illinois Certification No. 100224) for the analyses of RCRA Appendix IX heated purge and trap (HP/T) volatile organic compounds, purge and trap (P/T) volatile organic compounds, semivolatile organic compounds (base/neutral and acid extractable organic compounds) and metals. All samples included in this review are listed on Table 1. All samples were analyzed following USEPA SW-846 methodologies.

A data validation review was performed on all data prepared under a modified CLP-SOW 3/90 CLP-I data deliverable format. Data were examined to assess the usability of the results, as well as to assess compliance relative to data package deliverable requirements. The organic data review is based upon a rigorous review of the reported hold times, surrogate recoveries, blank spike recoveries, matrix spike and matrix spike duplicate summaries, blank contaminants, internal standard area performance, Gas Chromatography/Mass Spectroscopy (GC/MS) tuning and calibration data.

The inorganic data quality review is based on a review of the reported hold times, blank analysis results, blank spike recoveries, matrix spike and duplicate results, instrument calibration verification, post-digestion spike recoveries and Inductively Coupled Plasma (ICP) serial dilution analysis.

Details of the data validation/quality assurance review are presented in the narrative section of the report. The data is summarized on Table 1 of the report. Data qualifiers have been placed next to the results so that the data user can quickly assess the qualitative and/or quantitative reliability of the reported result. This report was prepared to provide a critical review of the laboratory analysis and reported chemical results. Quality assurance reviews of laboratory-generated data routinely identify problems associated with analytical measurements, even from the most experienced and capable laboratories.

This review has been performed in accordance with the requirements specified in the "Laboratory Data Validation Functional Guidelines for Evaluating Organic Analyses" dated February 1988 and "Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses" dated July 1988.

**TABLE 1**  
**SAMPLES INCLUDED IN REVIEW**

<u>Sample ID</u>	<u>Lab ID</u>	<u>Date Collected</u>	<u>Test Requested</u>
<u>Log Link No. 101353</u>			
SC-2-5	HA6096	10/2/91	RCRA Appendix IX HP/T VOA, P/T VOA, BNA & Metals
SC-2-15	HA6097	10/2/91	RCRA Appendix IX HP/T VOA, P/T VOA, BNA & Metals
FB-100291	HA6107	10/2/91	RCRA Appendix IX HP/T VOA, P/T VOA, BNA & Metals
TB-100291	HA6111	10/2/91	RCRA Appendix IX HP/T VOA, P/T VOA, BNA & Metals
TB-100391	HA6112	10/3/91	RCRA Appendix IX HP/T VOA & P/T VOA
<u>Log Link No. 101357</u>			
SC-1-5	HA6087	10/6/91	RCRA Appendix IX HP/T VOA, P/T VOA, BNA & Metals
SC-1-15	HA6088	10/6/91	RCRA Appendix IX HP/T VOA, P/T VOA, BNA & Metals
SC-1-40	HA6089	10/6/91	RCRA Appendix IX HP/T VOA, P/T VOA, BNA & Metals
SC-7-15	HA6098	10/6/91	RCRA Appendix IX HP/T VOA, P/T VOA, BNA & Metals
SC-7-40	HA6101	10/6/91	RCRA Appendix IX HP/T VOA, P/T VOA, BNA & Metals
SC-3-5	HA6102	10/5/91	RCRA Appendix IX HP/T VOA, P/T VOA, BNA & Metals
SC-3-15	HA6103	10/5/91	RCRA Appendix IX HP/T VOA, P/T VOA, BNA & Metals
SC-3-40	HA6104	10/5/91	RCRA Appendix IX HP/T VOA, P/T VOA, BNA & Metals
1DUP100591	HA6105	10/5/91	RCRA Appendix IX HP/T VOA, P/T VOA, BNA & Metals
TB100791	HA6113	10/5/91	RCRA Appendix IX HP/T VOA & P/T VOA
<u>Log Link No. 101362</u>			
SC-7-5	HA6106	10/5/91	RCRA Appendix IX HP/T VOA, P/T VOA, BNA & Metals
SC-5-5	HA6398	10/9/91	RCRA Appendix IX HP/T VOA, P/T VOA, BNA & Metals
SC-5-15	HA6399	10/9/91	RCRA Appendix IX HP/T VOA, P/T VOA, BNA & Metals
SC-5-40	HA6400	10/9/91	RCRA Appendix IX HP/T VOA, P/T VOA, BNA & Metals
2DUP100991	HA6404	10/9/91	RCRA Appendix IX HP/T VOA, P/T VOA, BNA & Metals
C-2-40	HA6406	10/3/91	RCRA Appendix IX BNA
FB100991	HA6108	10/9/91	RCRA Appendix IX HP/T VOA & P/T VOA & BNA
TB100991	HA6114	10/9/91	RCRA Appendix IX HP/T VOA & P/T VOA

Legend:

HP/T = Heated Purge and Trap  
P/T = Purge and Trap  
VOA = Volatile Organic Compounds  
BNA = Semivolatile Organic Compounds (Base/Neutral and Acid-Extractable Organic Compounds)

## GENERAL COMMENTS

With regard to the data package deliverables, most of the requirements were met with the exception of the metals fraction. This reviewer has observed that for the ICP concentrations reported at 10 to 15 times above the method detection limit (MDL), the data validation cannot reproduce the laboratory reported results. The calculation obtained during data validation is consistently higher than the laboratory reported concentration. This is due to the fact that the interelement correction factors in the ICP instrument have been externally calculated in the system. Since this external interelement correction factor is not available for review, the reported results for low level samples cannot be reproduced. It should be noted that positive ICP reported results that are significantly above the MDL (approximately 100 times higher or more) were reproduced and validated, since this interelement correction factor becomes negligible at higher concentrations. It is this reviewer's opinion that data usability is not impacted. The data review assumes that the low level reported concentrations (10 to 15 times the MDL) are correct as reported.

## DATA QUALIFIERS

Overall, the data quality is good. The data validation review has identified aspects of the analytical data that require qualification. To confidently use any of the data within the data set, the data user should understand the limitations and qualifications presented. With regard to data usability, the following qualifiers are offered based upon the data provided.

### ORGANIC QUALIFIERS

#### Hold Times:

- Samples SC-1-5, SC-1-15, SC-1-40, SC-7-15, SC-7-40 and SC-7-5 were extracted for semivolatile organic compounds 3 days outside the hold time requirements. Samples SC-3-5, SC-3-15, SC-3-40 and 1DUP100591 were extracted 4 days outside the hold time requirement for semivolatile organics. The positive and non-detected results of these samples may be biased low and have been flagged (J/UJ) estimated.

#### Blank Contamination:

- Due to the presence of di-n-butyl phthalate and bis(2-ethylhexyl)phthalate in the semivolatile laboratory blanks associated with all data sets, positive results in all samples are qualitatively questionable and have been flagged (B) on the summary table.

#### Surrogate Recoveries:

- The volatile surrogates, toluene-d8 and bromofluorobenzene (BFB), were recovered outside the control limits (high for toluene-d8 and low for BFB) for sample SC-2-15. The sample was re-analyzed with toluene-d8 only outside the control limits (high). The initial analysis was reported by the laboratory. The positive volatile compound results are regarded as estimated values and have been flagged (J) on the summary table. There is no impact on the non-detected results. It should be noted that these samples have also been flagged based on the assessment of the internal standard area performance (see Internal Standard Area Counts section of the report).
- The volatile surrogate, toluene, for samples SC-1-40, SC-7-15, SC-3-15, SC-3-40, SC-5-40 and 2DUP-100991, the surrogate compounds BFB for sample SC-7-15 and 1,2-dichloroethane-d4 (DCA) for sample SC-5-15, were recovered outside the control limits (high). These samples were re-analyzed and the majority of toluene recoveries were outside the control limits (high). The initial analyses for these samples was reported by the laboratory. The positive volatile compound results are regarded as estimated values and have been flagged (J) on the summary table. There is no impact on the non-detected results. It should be noted that the volatile compound results for these samples have been flagged based on the assessment of the internal standard area performance (see Internal Standard Area Counts section of the report).
- The acid-extractable surrogate compound, tribromophenol, was recovered outside the control limits (low) for samples SC-1-5, SC-1-15, SC-7-15, SC-7-4, SC-7-5, SC-5-5 and SC-5-40 and may be biased low. With the exception of samples SC-5-5 and SC-5-40, all other samples have been qualified based on the extraction hold time exceedence. No qualifier has been applied to samples SC-5-5 and SC-5-40 since only one surrogate per sample is outside the control limits.

#### Internal Standard Area Counts:

- The area counts of the following volatile internal standards were reported outside the control limits (low). The samples were re-analyzed and all internal standards area counts were outside the control limits (low) which may indicate matrix effects. For these samples, the initial analyses were reported by the laboratory. The positive and non-detected volatile compounds quantitated against the associated internal standard may be biased low and have been flagged (J/UJ) estimated on the summary table.

<u>Sample ID</u>	<u>Volatile Internal Standard</u>
SC-2-15	All Internal Standards
SC-1-40	All Internal Standards
SC-7-15	Difluorobenzene & Chlorobenzene-d5
SC-7-40	Difluorobenzene & Chlorobenzene-d5
SC-3-15	Difluorobenzene & Chlorobenzene-d5
SC-3-40	Difluorobenzene & Chlorobenzene-d5
SC-5-5	Chlorobenzene-d5
SC-5-40	Difluorobenzene & Chlorobenzene-d5
2DUP100991	Chlorobenzene-d5

- The area counts of the semivolatile internal standards, chrysene-d12 and perylene-d12, were outside the control limits for samples SC-2-5 and SC-2-15, SC-5-15 and SC-2-40. The positive and non-detected compounds quantitated against these internal standards may be biased low and have been flagged (J/UJ) estimated on the summary tables.
- The area counts of the semivolatile internal standard, perylene-d12 for samples SC-1-5, SC-1-15 and 1DUP100591, and chrysene-d12 for sample 1DUP100591 only, were outside the control limits (low) and may be biased low. The positive and non-detected compounds quantitated against this internal standard may be biased low and have been flagged (J/UJ) estimated on the summary tables. Note that these samples have been qualified based on the extraction hold time exceedence.

#### Matrix Spike and Matrix Spike Duplicate (MS/MSD) Summary:

- The volatile matrix spiking compound, acetonitrile, was recovered outside the control limits (high) for samples SC-2-15MS/MSD and may be biased high. No qualifier has been applied since this compound was non-detected in the unspiked sample.
- The volatile matrix spiking compound, acrylonitrile, was recovered outside the control limits (low) for the blank spike associated with ETC Log Link No. 101353. The non-detected results of this compound in the associated samples may be biased low and have been flagged (J/UJ) estimated.
- The reproducibilities of the volatile spiking compounds, carbon disulfide and trans-1,3-dichloropropene, for samples SC-2-5MS/MSD and SC-5-15MS/MSD are poor. The non-detected results of these compounds in the unspiked samples are regarded as estimated values and have been flagged (UJ) estimated on the summary tables.

- The volatile spiking compound, acrylonitrile, in samples SC-1-5MS/MSD and SC-5-15 MS/MSD were reported outside the control limits (low). The non-detected results of this compound in the unspiked sample may be biased low and have been flagged (UJ) estimated on the summary table.
- The volatile blank spike recoveries of methyl bromide, carbon disulfide, chloroethane, dichlorofluoromethane, methylene chloride, trans-1,3 dichloropropylene, iodomethane, methyl ethyl ketone (MEK), toluene, vinyl chloride, acetone, ethyl benzene, styrene and (total) xylenes, were recovered outside the control limits (low). The positive and/or non-detected results of these compounds in all samples may be biased low and have been flagged (J/UJ) estimated on the summary tables.
- The reproducibility of the acid-extractable spiking compound, 2,4-dimethylphenol, for samples SC-2-5MS and SC-2-5MSD is poor. The non-detected result of this compound in the unspiked sample of SC-2-5 is regarded as an estimated value and has been flagged (UJ) on the summary tables.
- The base/neutral spiking compound, 2,4-dinitrotoluene, was recovered outside the control limits (high) for samples SC-2-5MS/MSD and may be biased high. No qualifier has been applied since this compound was non-detected in the unspiked sample.
- In the base/neutral blank spike analysis, the recovery of di-n-butyl phthalate was outside the control limits (high). The positive results of this compound in all samples may be biased high and have been flagged (J) estimated. There is no impact on the non-detected results and no qualifier has been applied.
- Samples 1DUP100591 and 2DUP100991 were collected and submitted to the laboratory as a blind field duplicates of samples SC-3-5 and SC-5-5 respectively. The reproducibility of the organics results are good, providing a positive indication of the field techniques and laboratory precision associated with the samples.

#### Initial and Continuing Calibrations:

- Due to the high difference between the initial and continuing calibrations response factors, all positive results for the following HP/T and TCL volatile compounds have been flagged (J) estimated. The actual detection limits may be higher than reported and have been flagged (UJ) estimated on the summary table.

<u>Analyte</u>	<u>Log Link</u>	<u>Associated Sample</u>
Acetone	101357	1DUP100591 & SC-5-15
All HP/T VOA Compounds	101362	TB-100291
Acrolein	101363	All Samples
Acrylonitrile	101362 101357	All Samples SC-1-15, SC-1-40, SC-7-15, SC-7-40, SC-3-5, SC-3-15, SC-3-40, 1DUP- 100591 & SC-7-5
Isobutyl Alcohol	101362	FB-100291
Methylene Chloride, Chloroethane & Iodomethane	101357	SC-1-5, SC-7-15, SC-7-40, SC-3- 5, SC-3-15, SC-3-40, SC-5-40 & 2DUP100991

- Due to the high difference between the initial and continuing calibration response factors, all positive results for the following TCL and Appendix IX semivolatile compounds have been flagged (J) estimated. The actual detection limits may be higher than reported and have been flagged (UJ) estimated on the summary table.

<u>Analyte</u>	<u>Log Link</u>	<u>Associated Sample</u>
2,3,4,5-Tetrachlorophenol	101353	FB-100291 & SC-2-5
3,3'Dichlorobenzidine	101353	FB-100291
7,12-Dimethylbenzo(a)- anthracene	101357	SC-1-15
Hexachlorocyclopenta- diene, o-Nitroaniline, 4-Nitrophenol & p-Nitroaniline	101353 101357	SC-2-5 & SC-2-15 All Samples
Diphenylamine	101353	SC-2-5
Aniline, Benzoic acid, N-Nitroso-di-n-propyl- amine & Indeno(1,2,3-cd)pyrene	101537	SC-1-15

- The response factor of the volatile compound, methyl ethyl ketone (MEK) in all initial/continuing calibrations is less than 0.05. Positive results of these compounds may be biased low and have been flagged (J) estimated. The non-detected results are regarded as unusable and have been flagged (R) on the summary table.



- In the GC/MS initial and continuing calibrations, the response factors of the following semivolatile compounds are less than 0.05. The positive results of these compounds may be biased low and have been flagged (J) estimated. The non-detected results of these compounds are regarded as unreliable and have been flagged (R) estimated.

<u>Compound</u>	<u>Log Link</u>	<u>Associated Sample</u>
4-Aminobiphenyl	101353	All Samples
3,3'-Dimethylbenzidine	101353	SC-2-5
7,12-Dimethylbenzo-(a)anthracene	101353 101357	SC-2-5 SC-1-5, SC-7-5, SC-5-5, SC-5-15 and 2DUP100991
Hexachlorophene	101357	SC-7-40, SC-3-5, SC-3-15, SC-3-40, 1DUP100591, SC-7-5, SC-5-5, SC-5-15, SC-5-40 & 2DUP100991

Additional Comments:

- As per the requirements, all values calculated below the method detection limit should be considered estimated and have been flagged (J) on the data table.

## INORGANICS PARAMETER QUALIFIERS

Hold Times:

- All samples were digested and analyzed within the required hold time criteria for all metals analyses.

Blank Contamination:

- Trace presence of chromium and tin have been identified in the laboratory blank associated with data set 101357. However, there is no impact on data usability since the reported results are greater than 5 times the blank concentrations and all chromium and tin results are regarded as "real" values.

Instrument Calibration and Verification:

- The initial and continuing calibration verification recoveries of all metals were reported within control limits.

#### ICP Serial Dilution:

- In the ICP serial dilution of sample SC-2-5, the percent differences of copper, nickel and zinc were outside the control limits. The positive results of these analytes are regarded as estimated values and have been flagged (J) on the summary tables.
- The percent differences of the ICP serial dilution analyses of chromium, nickel and zinc for sample SC-1-5, and beryllium, copper, nickel and zinc for sample SC-5-15 were outside the control limits. The positive results of these analytes in the associated samples are regarded as estimated values and have been flagged (J) on the summary tables.

#### Matrix Spike and Duplicate Summary:

- Due to the low matrix spike recoveries of antimony, nickel, zinc, selenium and thallium for sample SC-2-5MS and antimony and selenium for sample SC-5-15, the positive results and non-detected results of these analytes in the unspiked samples may be biased low have been flagged (J/UJ) estimated on the summary tables.
- The matrix spike recoveries of arsenic and lead in sample SC-2-5MS and copper, nickel, and vanadium in sample SC-5-15MS were outside the control limits (high). The positive results of these analytes in the unspiked samples may be biased high and have been flagged (J) estimated on the summary tables.
- Due to the high relative percent differences (RPD) associated with the duplicate analyses of selenium and thallium in sample SC-1-5, positive results have been flagged (J) estimated.
- Samples 1DUP100591 and 2DUP100991 were collected and submitted to the laboratory as a blind field-duplicates of samples SC-3-5 and SC-5-5 respectively. The reproducibility of the metals results are good, providing a positive indication of the field techniques and laboratory precision associated with the samples.

#### Post-Digestion Spike Recoveries:

- The post-spike recoveries of the following analytes were recovered outside the control limits (low). Positive and/or non-detected results of these analytes for the associated samples may be biased low and have been flagged (J) estimated.

<u>Analyte</u>	<u>Data Set</u>	<u>Associated Sample</u>
Selenium	101353	SC-2-5 & SC-2-15
	101357	All Samples
Thallium	101353	SC-2-5 & SC-2-15

- The post-spike recoveries of thallium for samples SC-3-5 and SC-5-5 were outside the control limits (high) and may be biased high. The positive thallium result in sample SC-3-5 has been flagged (J) estimated. There is no impact on the data quality for the non-detected thallium result in sample SC-5-5 and no qualifier has been applied.

**Additional Comments:**

- The laboratory reports several inorganic results as below the method detection limit (BMDL). These are reported as BMDL on Table 2. The actual concentrations were not calculated during the data validation review since the interelement coefficient factors were not provided.

TABLE 2  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO INCINERATOR FACILITY

Dames and Moore Sample Number			SC-2-5	SC-2-15	FB-100291	TB-10291	TB-10391	SC-1-5	SC1-1-15	SC-1-40	SC-7-15	SC-7-40
Laboratory Sample Number			HA6096	HA6097	HA6107	HA6111	HA6112	HA6087	HA6088	HA6089	HA6098	HA6101
Sampling Date	Quant	Quant	10/2/91	10/2/91	10/2/91	10/2/91	10/3/91	10/6/91	10/6/91	10/6/91	10/6/91	10/6/91
Dilution Factor	Limit	Limit	1.2	1.2	1.0	1.0	1.0	1.2	1.3	1.1	1.2	1.1
Units	ug/L	ug/kg	ug/kg	ug/kg	ug/L	ug/L	ug/L	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
HEATED P/T VOLATILE COMPOUNDS												
Acetonitrile	15	15	U	U	U	UJ	U	U	U	U	U	U
Acrolein	20	20	UJ	UJ	UJ	UJ	UJ	U	U	U	U	U
Acrylonitrile	10	10	UJ	UJ	UJ	UJ	UJ	UJ	U	UJ	UJ	UJ
1,4-Dioxane	300	300	U	U	U	UJ	U	U	U	U	U	U
Ethyl cyanide	40	40	U	U	U	UJ	U	U	U	U	U	U
Isobutyl alcohol	230	230	U	U	UJ	UJ	U	U	U	U	U	U
Methacrylonitrile	110	110	U	U	U	UJ	U	U	U	U	U	U

continued on next page (see last page for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO INCINERATOR FACILITY

Dames and Moore Sample Number			SC-2-5	SC-2-15	FB-100291	TB-10291	TB-10391	SC-1-5	SC1-1-15	SC-1-40	SC-7-15	SC-7-40
Laboratory Sample Number			HA6096	HA6097	HA6107	HA6111	HA6112	HA6087	HA6088	HA6089	HA6088	HA6101
Sampling Date	Quant	Quant	10/2/91	10/2/91	10/2/91	10/2/91	10/3/91	10/6/91	10/6/91	10/6/91	10/6/91	10/6/91
Dilution Factor	Limit	Limit	1.2	1.2	1.0	1.0	1.0	1.2	1.3	1.1	1.2	1.1
Units	ug/L	ug/kg	ug/kg	ug/kg	ug/L	ug/L	ug/L	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
APPENDIX IX P/T VOLATILE COMPOUNDS												
Benzene	4.4	4.4	U	UJ	U	U	U	UJ	UJ	UJ	UJ	UJ
Methyl bromide	10	10	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Carbon disulfide	10	10	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Chloroethane	10	10	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Chlorobenzene	6.0	6.0	U	UJ	U	U	U	UJ	UJ	UJ	UJ	UJ
2-Chloro-1,3-butadiene	-	-	U	UJ	U	U	U	UJ	UJ	UJ	UJ	UJ
Chloroform	1.6	1.6	U	UJ	U	U	U	UJ	UJ	UJ	UJ	UJ
Methyl chloride	10	10	U	UJ	U	U	U	UJ	UJ	UJ	UJ	UJ
3-Chloropropene	10	10	U	UJ	U	U	U	UJ	UJ	UJ	UJ	UJ
1,2-Dibromo-3-chloropropane	10	10	U	UJ	U	U	U	UJ	UJ	UJ	UJ	UJ
1,2-Dibromoethane	10	10	U	UJ	U	U	U	UJ	UJ	UJ	UJ	UJ
Dibromomethane	10	10	U	UJ	U	U	U	UJ	UJ	UJ	UJ	UJ
1,4-Dichloro-2-butene	10	10	U	UJ	U	U	U	UJ	UJ	UJ	UJ	UJ
Dichlorodifluoromethane	10	10	U	UJ	U	U	U	UJ	UJ	UJ	UJ	UJ
1,1-Dichloroethane	4.7	4.7	U	UJ	U	U	U	UJ	UJ	UJ	UJ	UJ
1,2-Dichloroethane	2.8	2.8	U	UJ	U	U	U	UJ	UJ	UJ	UJ	UJ
1,2-Dichloroethane (trans)	1.6	1.6	U	UJ	U	U	U	UJ	UJ	UJ	UJ	UJ
1,1-Dichloroethane	2.8	2.8	U	UJ	U	U	U	UJ	UJ	UJ	UJ	UJ
Methylene Chloride	2.8	2.8	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
1,2-Dichloropropene	6.0	6.0	U	UJ	U	U	U	UJ	UJ	UJ	UJ	UJ
cis-1,3-Dichloropropene	5.0	5.0	U	UJ	U	U	U	UJ	UJ	UJ	UJ	UJ
trans-1,3-Dichloropropene	10	10	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Chlorodibromomethane	3.1	3.1	U	UJ	U	U	U	UJ	UJ	UJ	UJ	UJ
Dichlorobromomethane	2.2	2.2	U	UJ	U	U	U	UJ	UJ	UJ	UJ	UJ
Ethyl methacrylate	10	10	U	UJ	U	U	U	UJ	UJ	UJ	UJ	UJ
Iodomethane	10	10	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Methyl ethyl ketone	10	10	R	R	R	R	R	R	R	R	R	R
Methyl methacrylate	10	10	U	UJ	U	U	U	UJ	UJ	UJ	UJ	UJ
Pentachloroethane	-	-	U	UJ	U	U	U	UJ	UJ	UJ	UJ	UJ
1,1,1,2-Tetrachloroethane	10	10	U	UJ	U	U	U	UJ	UJ	UJ	UJ	UJ
1,1,2,2-Tetrachloroethane	4.1	4.1	U	UJ	U	U	U	UJ	UJ	UJ	UJ	UJ
Tetrachloroethene	4.1	4.1	U	UJ	U	U	U	UJ	UJ	UJ	UJ	UJ
Carbon Tetrachloride	2.8	2.8	U	UJ	U	U	U	UJ	UJ	UJ	UJ	UJ
Toluene	6.0	6.0	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Bromoform	4.7	4.7	U	UJ	U	U	U	UJ	UJ	UJ	UJ	UJ
1,1,1-Trichloroethane	3.8	3.8	U	UJ	U	U	U	UJ	UJ	UJ	UJ	UJ
1,1,2-Trichloroethane	5.0	5.0	U	UJ	U	U	U	UJ	UJ	UJ	UJ	UJ

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TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO INCINERATOR FACILITY

Dames and Moore Sample Number			SC-2-5	SC-2-15	FB-100291	TB-10291	TB-10391	SC-1-5	SC1-1-15	SC-1-40	SC-7-15	SC-7-40
Laboratory Sample Number			HA6096	HA6097	HA6107	HA6111	HA6112	HA6087	HA6088	HA6089	HA6098	HA6101
Sampling Date	Quant	Quant	10/2/91	10/2/91	10/2/91	10/2/91	10/3/91	10/6/91	10/6/91	10/6/91	10/6/91	10/6/91
Dilution Factor	Limit	Limit	1.2	1.2	1.0	1.0	1.0	1.2	1.3	1.1	1.2	1.1
Units	ug/L	ug/kg	ug/kg	ug/kg	ug/L	ug/L	ug/L	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
APPENDIX IX P/T VOLATILE COMPOUNDS (continued)												
Trichloroethene	1.9	1.9	U	UJ	U	U	U	U	U	UJ	UJ	UJ
Trichlorofluoromethane	10	10	U	UJ	U	U	U	U	U	UJ	UJ	UJ
1,2,3-Trichloropropane	10	10	U	UJ	U	U	U	U	U	UJ	UJ	UJ
Vinyl Chloride	10	10	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Acetone	10	10	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Ethylbenzene	7.2	7.2	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
2-Hexanone	10	10	U	UJ	U	U	U	U	U	UJ	UJ	UJ
Methyl isobutyl ketone	10	10	U	UJ	U	U	U	U	U	UJ	UJ	UJ
Styrene	10	10	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Vinyl acetate	10	10	U	UJ	U	U	U	U	U	UJ	UJ	UJ
m-Xylene	10	10	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
o,p-Xylenes	10	10	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ

continued on next page (see last page for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO INCINERATOR FACILITY

Dames and Moore Sample Number			SC-2-5	SC-2-15	FB-100291	TB-10291	TB-10391	SC-1-5	SC1-1-15	SC-1-40	SC-7-15	SC-7-40
Laboratory Sample Number			HA6096	HA6097	HA6107	HA6111	HA6112	HA6087	HA6088	HA6089	HA6098	HA6101
Sampling Date	Quant	Quant	10/2/91	10/2/91	10/2/91	10/2/91	10/3/91	10/6/91	10/6/91	10/6/91	10/6/91	10/6/91
Dilution Factor	Limit	Limit	1.2	1.2	1.0	NA	NA	1.2	1.3	1.1	1.2	1.1
Units	ug/L	ug/kg	ug/kg	ug/kg	ug/L	ug/L	ug/L	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
APPENDIX IX SEMIVOLATILE COMPOUNDS												
Acetophenone	10	1000	U	U	U	NA	NA	UJ	UJ	UJ	UJ	UJ
2-Acetylaminofluorene	10	1000	UJ	UJ	U	NA	NA	UJ	UJ	UJ	UJ	UJ
4-Aminobiphenyl	10	1000	R	R	R	NA	NA	R	R	R	R	R
Aniline	10	1000	U	U	U	NA	NA	UJ	UJ	UJ	UJ	UJ
Aramidite	10	1000	UJ	UJ	U	NA	NA	UJ	UJ	UJ	UJ	UJ
Benzo(a)anthracene	8.0	790	UJ	UJ	U	NA	NA	UJ	UJ	UJ	UJ	UJ
Benzo(b)fluoranthene	4.9	490	UJ	UJ	U	NA	NA	UJ	UJ	UJ	UJ	UJ
Benzo(a)pyrene	2.6	250	UJ	UJ	U	NA	NA	UJ	UJ	UJ	UJ	UJ
Bis(2-Chloroethoxy)methane	5.5	540	U	U	U	NA	NA	UJ	UJ	UJ	UJ	UJ
Bis(2-chloroethyl) ether	5.9	580	U	U	U	NA	NA	UJ	UJ	UJ	UJ	UJ
Bis(2-chloroisopropyl)ether	5.9	580	U	U	U	NA	NA	UJ	UJ	UJ	UJ	UJ
Bis(2-Ethylhexyl)phthalate	10	1000	4810 BJ	9410 BJ	U	NA	NA	3870 JB	7690 JB	7750 JB	10800 JB	7600 JB
4-Bromophenylphenyl ether	2.0	190	U	U	U	NA	NA	UJ	UJ	UJ	UJ	UJ
Butylbenzylphthalate	10	1000	UJ	UJ	U	NA	NA	UJ	UJ	UJ	UJ	UJ
2-sec-Butyl-4,6-dinitrophen	10	1000	U	U	U	NA	NA	UJ	UJ	UJ	UJ	UJ
p-Chloroaniline	10	1000	U	U	U	NA	NA	UJ	UJ	UJ	UJ	UJ
p-Chloro-m-cresol	3.1	300	U	U	U	NA	NA	UJ	UJ	UJ	UJ	UJ
2-Chloronaphthalene	2.0	190	U	U	U	NA	NA	UJ	UJ	UJ	UJ	UJ
2-Chlorophenol	3.4	330	U	U	U	NA	NA	UJ	UJ	UJ	UJ	UJ
Chrysene	2.6	250	UJ	UJ	U	NA	NA	UJ	UJ	UJ	UJ	UJ
Acenaphthene	2.0	190	U	U	U	NA	NA	UJ	UJ	UJ	UJ	UJ
Acenaphthylene	3.6	350	U	U	U	NA	NA	UJ	UJ	UJ	UJ	UJ
Anthracene	2.0	190	U	U	U	NA	NA	UJ	UJ	UJ	UJ	UJ
Benzo(ghi)perylene	3.2	415	UJ	UJ	U	NA	NA	UJ	UJ	UJ	UJ	UJ
Benzo(k)fluoranthene	2.6	250	UJ	UJ	U	NA	NA	UJ	UJ	UJ	UJ	UJ
Fluorene	2.0	190	U	U	U	NA	NA	UJ	UJ	UJ	UJ	UJ
Phenanthrene	5.6	550	U	429 J	U	NA	NA	UJ	UJ	BMDL	BMDL	UJ
Pyrene	2.0	190	U	U	U	NA	NA	UJ	UJ	UJ	UJ	UJ
2-Nitrophenol	3.7	365	U	U	U	NA	NA	UJ	UJ	UJ	UJ	UJ
o-Cresol	10	1000	U	U	U	NA	NA	UJ	UJ	UJ	UJ	UJ
m+p-Cresols	10	1000	U	U	U	NA	NA	UJ	UJ	UJ	UJ	UJ
Diallate	10	1000	U	U	U	NA	NA	UJ	UJ	UJ	UJ	UJ
Dibenzo(a,h)anthracene	2.6	250	UJ	UJ	U	NA	NA	UJ	UJ	UJ	UJ	UJ
Di-n-butyl phthalate	10	1000	6080 BJ	6580 BJ	U	NA	NA	2620 JB	4350 JB	3070 JB	4250 JB	8240 JB
1,2-Dichlorobenzene	2.0	190	U	U	U	NA	NA	UJ	UJ	UJ	UJ	UJ
1,3-Dichlorobenzene	2.0	190	U	U	U	NA	NA	UJ	UJ	UJ	UJ	UJ
1,4-Dichlorobenzene	4.5	450	U	U	U	NA	NA	UJ	UJ	UJ	UJ	UJ
3,3-Dichlorobenzidine	17	1675	UJ	UJ	UJ	NA	NA	UJ	UJ	UJ	UJ	UJ
2,4-Dichlorophenol	2.8	275	U	U	U	NA	NA	UJ	UJ	UJ	UJ	UJ
2,6-Dichlorophenol	10	1000	U	U	U	NA	NA	UJ	UJ	UJ	UJ	UJ

continued next page (see last page of table for notes).

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO INCINERATOR FACILITY

Dames and Moore Sample Number Laboratory Sample Number Sampling Date Dilution Factor Units	Quant Limit ug/L	Quant Limit ug/kg	SC-2-5 HA6096 10/2/91 1.2 ug/kg	SC-2-15 HA6097 10/2/91 1.2 ug/kg	FB-100291 HA6107 10/2/91 1.0 ug/L	TB-10291 HA6111 10/2/91 NA ug/L	TB-10391 HA6112 10/3/91 NA ug/L	SC-1-5 HA6087 10/6/91 1.2 ug/kg	SC1-1-15 HA6088 10/6/91 1.3 ug/kg	SC-1-40 HA6089 10/6/91 1.1 ug/kg	SC-7-15 HA6098 10/6/91 1.2 ug/kg	SC-7-40 HA6101 10/6/91 1.1 ug/kg
APPENDIX IX SEMIVOLATILE COMPOUNDS (continued)												
Diethylphthalate	10	1000	U	U	U	NA	NA	UJ	UJ	UJ	UJ	UJ
p-Dimethylaminobenzene	10	1000	UJ	UJ	U	NA	NA	UJ	UJ	UJ	UJ	UJ
7,12-Dimethylbenzo(a)anthra	10	1000	R	UJ	U	NA	NA	R	UJ	UJ	UJ	UJ
3,3-Dimethylbenzidine	10	1000	R	UJ	U	NA	NA	UJ	UJ	UJ	UJ	UJ
a-a-Dimethylphenethylamine	-	-	-	-	-	NA	NA	-	-	-	-	-
2,4-Dimethylphenol	2.8	275	UJ	U	U	NA	NA	UJ	UJ	UJ	UJ	UJ
Dimethyl phthalate	10	1000	U	U	U	NA	NA	UJ	UJ	UJ	UJ	UJ
m-Dinitrobenzene	10	1000	U	U	U	NA	NA	UJ	UJ	UJ	UJ	UJ
4,6-Dinitro-0-cresol	25	2400	U	U	U	NA	NA	UJ	UJ	UJ	UJ	UJ
2,4-Dinitrophenol	43	4250	U	U	U	NA	NA	UJ	UJ	UJ	UJ	UJ
2,4-Dinitrotoluene	5.9	580	U	U	U	NA	NA	UJ	UJ	UJ	UJ	UJ
2,6-Dinitrotoluene	2.0	190	U	U	U	NA	NA	UJ	UJ	UJ	UJ	UJ
Di-n-octyl phthalate	10	1000	UJ	UJ	U	NA	NA	UJ	UJ	UJ	UJ	UJ
Diphenylamine	10	1000	UJ	U	U	NA	NA	UJ	UJ	UJ	UJ	UJ
N-nitroso-di-n-propylamine	10	1000	U	U	U	NA	NA	UJ	UJ	UJ	UJ	UJ
Ethyl methanesulfonate	10	1000	U	U	U	NA	NA	UJ	UJ	UJ	UJ	UJ
Fluoranthene	2.3	225	U	U	U	NA	NA	UJ	UJ	UJ	UJ	UJ
Hexachlorobenzene	2.0	190	U	U	U	NA	NA	UJ	UJ	UJ	UJ	UJ
Hexachlorobutadiene	0.93	90	U	U	U	NA	NA	UJ	UJ	UJ	UJ	UJ
Hexachlorocyclopentadiene	10	1000	U	U	U	NA	NA	UJ	UJ	UJ	UJ	UJ
Hexachloroethene	1.6	165	U	U	U	NA	NA	UJ	UJ	UJ	UJ	UJ
Isodrin	6.1	1000	U	U	U	NA	NA	UJ	UJ	UJ	UJ	UJ
Hexachlorophene	10	1000	U	U	U	NA	NA	UJ	UJ	UJ	UJ	R
Hexachloropropene	10	1000	U	U	U	NA	NA	UJ	UJ	UJ	UJ	UJ
Indeno(1,2,3-c,d)pyrene	3.8	365	UJ	UJ	U	NA	NA	UJ	UJ	UJ	UJ	UJ
Isosafrole	10	600	U	U	U	NA	NA	UJ	UJ	UJ	UJ	UJ
Methapyrene	-	-	IND	IND	IND	NA	NA	IND	IND	IND	IND	IND
3-Methylcholanthrene	5.7	555	UJ	UJ	U	NA	NA	UJ	UJ	UJ	UJ	UJ
Methyl methanesulfonate	10	1000	U	U	U	NA	NA	UJ	UJ	UJ	UJ	UJ
Naphthalene	1.6	165	U	U	U	NA	NA	UJ	UJ	UJ	UJ	UJ
1,4-Naphthoquinone	10	1000	U	U	U	NA	NA	UJ	UJ	UJ	UJ	UJ
1-Naphthylamine	10	1000	U	U	U	NA	NA	UJ	UJ	UJ	UJ	UJ
2-Naphthylamine	10	1000	U	U	U	NA	NA	UJ	UJ	UJ	UJ	UJ
p-Nitroaniline	10	1000	U	U	U	NA	NA	UJ	UJ	UJ	UJ	UJ
Nitrobenzene	2.0	190	U	U	U	NA	NA	UJ	UJ	UJ	UJ	UJ
4-Nitrophenol	2.5	240	U	U	U	NA	NA	UJ	UJ	UJ	UJ	UJ
4-Nitroquinoline-N-oxide	-	-	IND	IND	IND	NA	NA	IND	IND	IND	IND	IND
N-Nitrosodiphenylamine	2.0	190	U	U	U	NA	NA	UJ	UJ	UJ	UJ	UJ
N-Nitrosodi-n-butylamine	10	1000	U	U	U	NA	NA	UJ	UJ	UJ	UJ	UJ
N-Nitrosodimethylamine	10	1000	U	U	U	NA	NA	UJ	UJ	UJ	UJ	UJ
N-Nitrosodimethylamine	10	1000	U	U	U	NA	NA	UJ	UJ	UJ	UJ	UJ
N-Nitrosomethylamine	10	1000	U	U	U	NA	NA	UJ	UJ	UJ	UJ	UJ

continued on next page (see last page for notes)



TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO INCINERATOR FACILITY

Dames and Moore Sample Number Laboratory Sample Number Sampling Date Dilution Factor Units	Quant Limit ug/L	Quant Limit ug/kg	SC-2-5 HA6096 10/2/91 1.2 ug/kg	SC-2-15 HA6097 10/2/91 1.2 ug/kg	FB-100291 HA6107 10/2/91 1.0 ug/L	TB-10291 HA6111 10/2/91 NA ug/L	TB-10391 HA6112 10/3/91 NA ug/L	SC-1-5 HA6087 10/6/91 1.2 ug/kg	SC1-1-15 HA6088 10/6/91 1.3 ug/kg	SC-1-40 HA6089 10/6/91 1.1 ug/kg	SC-7-15 HA6098 10/6/91 1.2 ug/kg	SC-7-40 HA6101 10/6/91 1.1 ug/kg
APPENDIX IX SEMIVOLATILE COMPOUNDS (continued)												
N-Nitrosomorpholine	10	1000	U	U	U	NA	NA	UJ	UJ	UJ	UJ	UJ
N-Nitrosopiperidine	10	1000	U	U	U	NA	NA	UJ	UJ	UJ	UJ	UJ
N-Nitrosopyrrolidine	10	1000	U	U	U	NA	NA	UJ	UJ	UJ	UJ	UJ
5-Nitro-o-toluidine	10	1000	U	U	U	NA	NA	UJ	UJ	UJ	UJ	UJ
Pentachlorobenzene	10	1000	U	U	U	NA	NA	UJ	UJ	UJ	UJ	UJ
Pentachloronitrobenzene	10	1000	U	U	U	NA	NA	UJ	UJ	UJ	UJ	UJ
Pentachlorophenol	3.7	365	U	U	U	NA	NA	UJ	UJ	UJ	UJ	UJ
Phenacetin	10	1000	U	U	U	NA	NA	UJ	UJ	UJ	UJ	UJ
Phenol	1.5	150	U	U	U	NA	NA	UJ	UJ	UJ	UJ	UJ
m-phenylenediamine	10	1000	U	U	U	NA	NA	UJ	UJ	UJ	UJ	UJ
o-phenylenediamine	10	1000	U	U	U	NA	NA	UJ	UJ	UJ	UJ	UJ
p-phenylenediamine	10	1000	U	U	U	NA	NA	UJ	UJ	UJ	UJ	UJ
2-Picoline	10	1000	U	U	U	NA	NA	UJ	UJ	UJ	UJ	UJ
Pronamide	10	1000	U	U	U	NA	NA	UJ	UJ	UJ	UJ	UJ
Pyridine	10	1000	U	U	U	NA	NA	UJ	UJ	UJ	UJ	UJ
Safrole	10	1000	U	U	U	NA	NA	UJ	UJ	UJ	UJ	UJ
1,2,4,5-Tetrachlorobenzene	10	1000	U	U	U	NA	NA	UJ	UJ	UJ	UJ	UJ
2,3,4,6-Tetrachlorophenol	10	1000	UJ	U	UJ	NA	NA	UJ	UJ	UJ	UJ	UJ
Tetraethyldithiopyrophospha	-	-	U	U	U	NA	NA	UJ	UJ	UJ	UJ	UJ
o-Toluidine	10	1000	U	U	U	NA	NA	UJ	UJ	UJ	UJ	UJ
1,2,4-Trichlorobenzene	2.0	190	U	U	U	NA	NA	UJ	UJ	UJ	UJ	UJ
2,4,5-Trichlorophenol	10	1000	U	U	U	NA	NA	UJ	UJ	UJ	UJ	UJ
2,4,6-Trichlorophenol	2.8	275	U	U	U	NA	NA	UJ	UJ	UJ	UJ	UJ
0,0,0-Triethyl phosphorothi	-	-	-	-	-	NA	NA	-	-	-	-	-
sym-Trinitrobenzene	-	-	IND	IND	IND	NA	NA	IND	IND	IND	IND	IND
Benzyl alcohol	10	1000	U	U	U	NA	NA	UJ	UJ	UJ	UJ	UJ
Dibenzofuran	10	1000	U	U	U	NA	NA	UJ	UJ	UJ	UJ	UJ
Isophorone	2.3	225	U	U	U	NA	NA	UJ	UJ	UJ	UJ	UJ
2-Methylnaphthalene	10	1000	U	U	U	NA	NA	UJ	BMDL	UJ	UJ	UJ
o-Nitroaniline	10	1000	U	U	U	NA	NA	UJ	UJ	UJ	UJ	UJ
m-Nitroaniline	10	1000	U	U	U	NA	NA	UJ	UJ	UJ	UJ	UJ
4-Chlorophenyl phenyl ether	4.3	425	U	U	U	NA	NA	UJ	UJ	UJ	UJ	UJ

continued on next page (see last page for notes)

**TABLE 2 (continued)**  
**SUMMARY OF ANALYTICAL RESULTS**  
**PHASE II INVESTIGATION**  
**CHEMICAL WASTE MANAGEMENT**  
**CHICAGO INCINERATOR FACILITY**

Dames and Moore Sample Number	Quant	Quant	SC-2-5	SC-2-15	FB-100291	TB-100291	TB-100391	SC-1-5	SC-1-15	SC-1-40	SC-7-15	SC-7-40
Laboratory Sample Number	Limit	Limit	HA6096	HA6097	HA6107	HA6111	HA6112	HA6087	HA6088	HA6089	HA6098	HA6101
Sampling Date	ug/L	ug/kg	10/2/91	10/2/91	10/2/91	10/2/91	10/3/91	10/6/91	10/6/91	10/6/91	10/6/91	10/6/91
Units	ug/L	ug/kg	ug/kg	ug/kg	ug/L	ug/L	ug/L	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
<b>INORGANIC PARAMETERS (METALS)</b>												
Antimony	60	6000	UJ	UJ	U	NA	NA	U	U	U	U	U
Arsenic	10	1000	6700 J	15000	U	NA	NA	8000	2900	11000	12000	8900
Barium	20	2000	46000	11000	U	NA	NA	47000	55000	21000	23000	33000
Beryllium	1.0	100	670	440	U	NA	NA	740	870 J	580	580	720
Cadmium	2.0	200	2900	3500	U	NA	NA	1400	1500	1900	1800	1800
Chromium	10	1000	17000	9300	U	NA	NA	18000 J	23000	14000	16000	17000
Cobalt	20	2000	11000	13000	U	NA	NA	12000	13000	13000	15000	12000
Copper	10	1000	26000 J	50000 J	U	NA	NA	27000	25000 J	40000	40000	29000
Lead	5.0	500	13000 J	20000	U	NA	NA	14000	13000	21000	24000	21000
Mercury	0.20	80	U	U	U	NA	NA	BMDL	BMDL	BMDL	BMDL	BMDL
Nickel	20	1000	29000 J	32000 J	U	NA	NA	30000 J	35000 J	31000	37000	30000
Selenium	5.0	500	UJ	BMDL J	U	NA	NA	BMDL J	BMDL J	BMDL J	BMDL J	BMDL J
Silver	10	1000	BMDL	U	U	NA	NA	BMDL	BMDL	BMDL	BMDL	U
Thallium	10	1000	U	BMDL J	U	NA	NA	BMDL J	U	1200	1700	1200
Tin	50	5000	33000	29000	U	NA	NA	31000	31000	28000	25000	28000
Vanadium	20	2000	22000	16000 J	U	NA	NA	24000	27000	18000	19000	21000
Zinc	20	2000	54000 J	90000	U	NA	NA	48000 J	56000 J	79000	66000	61000

**LEGEND:**

- U Compound was not detected at laboratory method detection limit.
  - J Estimated value due to limitations identified during the quality assurance review.
  - UJ Reported method detection limit is estimated due to limitations identified during the quality assurance review.
  - B Compound was detected in a laboratory and/or field blank at similar concentrations. May represent laboratory and/or field contamination.
  - R Unreliable result. Compound may or may not be present.
  - \* Sample analyzed at multiple dilutions. Summary table is a hybrid of diluted and undiluted results.
  - No standard available. Compound was qualitatively searched for.
  - IND Indeterminate. Standard and/or spikes could not be detected at method detection limit.
  - BMDL Below Method Detection Limit reported by laboratory.
- Discrepancies may exist between the laboratory data tables and the data validation summary tables due to variations in the rounding of calculations.

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO INCINERATOR FACILITY

Dames and Moore Sample Number			8C-3-5	8C-3-15	8C-3-40	1DUP100591	8C-7-5	8C-5-5	8C-5-15	8C-5-40	2DUP100591	8C-2-40	2FB100591	TB100791	TB100591
Laboratory Sample Number	Quant	Quant	HA6102	HA6103	HA6104	HA6105	HA6106	HA6398	HA6399	HA6400	HA6404	HA6406	HA6108	HA6113	HA6114
Sampling Date	Limit	Limit	10/5/91	10/5/91	10/5/91	10/5/91	10/5/91	10/9/91	10/9/91	10/9/91	10/9/91	10/9/91	10/9/91	10/7/91	10/9/91
Dilution Factor	ug/L	ug/kg	1.2	1.2	1.1	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.0	1.0	1.0
Units	ug/L	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/L	ug/L	ug/L
HEATED P/T VOLATILE COMPOUNDS															
Acetonitrile	15	15	U	U	U	U	U	U	U	U	U	NA	U	U	U
Acrolein	20	20	U	U	U	U	U	U	U	U	U	NA	U	U	U
Acrylonitrile	10	10	U	U	U	U	U	U	U	U	U	NA	U	U	U
1,4-Dioxane	300	300	U	U	U	U	U	U	U	U	U	NA	U	U	U
Ethyl cyanide	40	40	U	U	U	U	U	U	U	U	U	NA	U	U	U
Isobutyl alcohol	230	230	U	U	U	U	U	U	U	U	U	NA	U	U	U
Methacrylonitrile	110	110	U	U	U	U	U	U	U	U	U	NA	U	U	U

continued on next page (see last page for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO INCINERATOR FACILITY

Dames and Moore Sample Number	Quant	Quant	8C-3-5	8C-3-15	8C-3-40	1DUP100991	8C-7-5	8C-5-5	8C-5-15	8C-5-40	2DUP100991	8C-2-40	2FB100991	TB100791	TB100991
Laboratory Sample Number	Limit	Limit	HA6102	HA6103	HA6104	HA6105	HA6106	HA6396	HA6399	HA6400	HA6404	HA6406	HA6108	HA6113	HA6114
Sampling Date	ug/L	ug/kg	10/5/91	10/5/91	10/5/91	10/5/91	10/5/91	10/9/91	10/9/91	10/9/91	10/9/91	10/9/91	10/9/91	10/7/91	10/9/91
Dilution Factor			1.2	1.2	1.1	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.0	1.0	1.0
Units			ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/L	ug/L	ug/L
APPENDIX IX P/T VOLATILE COMPOUNDS															
Benzene	4.4	4.4	U	U	U	U	U	U	U	U	U	NA	U	U	U
Methyl bromide	10	10	U	U	U	U	U	U	U	U	U	NA	U	U	U
Carbon disulfide	10	10	U	U	U	U	U	U	U	U	U	NA	U	U	U
Chloroethane	10	10	U	U	U	U	U	U	U	U	U	NA	U	U	U
Chlorobenzene	6.0	6.0	U	U	U	U	2.0 J	U	U	U	U	NA	U	U	U
2-Chloro-1,3-butadiene	-	-	U	U	U	U	U	U	U	U	U	NA	U	U	U
Chloroform	1.6	1.6	U	U	U	U	U	U	U	U	U	NA	U	U	U
Methyl chloride	10	10	U	U	U	U	U	U	U	U	U	NA	U	U	U
3-Chloropropene	10	10	U	U	U	U	U	U	U	U	U	NA	U	U	U
1,2-Dibromo-3-chloroprope	10	10	U	U	U	U	U	U	U	U	U	NA	U	U	U
1,2-Dibromoethane	10	10	U	U	U	U	U	U	U	U	U	NA	U	U	U
Dibromomethane	10	10	U	U	U	U	U	U	U	U	U	NA	U	U	U
1,4-Dichloro-2-butene	10	10	U	U	U	U	U	U	U	U	U	NA	U	U	U
Dichlorodifluoromethane	10	10	U	U	U	U	U	U	U	U	U	NA	U	U	U
1,1-Dichloroethane	4.7	4.7	U	U	U	U	U	U	U	U	U	NA	U	U	U
1,2-Dichloroethane	2.8	2.8	U	U	U	U	U	U	U	U	U	NA	U	U	U
1,2-Dichloroethane (trans)	1.6	1.6	U	U	U	U	U	U	U	U	U	NA	U	U	U
1,1-Dichloroethane	2.8	2.8	U	U	U	U	U	U	U	U	U	NA	U	U	U
Methylene Chloride	2.8	2.8	U	U	U	U	U	U	U	U	U	NA	U	U	U
1,2-Dichloropropane	6.0	6.0	U	U	U	U	U	U	U	U	U	NA	U	U	U
cis-1,3-Dichloropropene	5.0	5.0	U	U	U	U	U	U	U	U	U	NA	U	U	U
trans-1,3-Dichloropropene	10	10	U	U	U	U	U	U	U	U	U	NA	U	U	U
Chlorodibromomethane	3.1	3.1	U	U	U	U	U	U	U	U	U	NA	U	U	U
Dichlorobromomethane	2.2	2.2	U	U	U	U	U	U	U	U	U	NA	U	U	U
Ethyl methacrylate	10	10	U	U	U	U	U	U	U	U	U	NA	U	U	U
Iodomethane	10	10	U	U	U	U	U	U	U	U	U	NA	U	U	U
Methyl ethyl ketone	10	10	R	R	R	R	R	R	R	R	R	NA	R	R	R
Methyl methacrylate	10	10	U	U	U	U	U	U	U	U	U	NA	U	U	U
Pentachloroethane	-	-	U	U	U	U	U	U	U	U	U	NA	U	U	U
1,1,1,2-Tetrachloroethane	10	10	U	U	U	U	U	U	U	U	U	NA	U	U	U
1,1,2,2-Tetrachloroethane	4.1	4.1	U	U	U	U	U	U	U	U	U	NA	U	U	U
Tetrachloroethane	4.1	4.1	U	U	U	U	U	U	U	U	U	NA	U	U	U
Carbon Tetrachloride	2.8	2.8	U	U	U	U	U	U	U	U	U	NA	U	U	U
Toluene	6.0	6.0	U	U	U	U	U	U	U	U	U	NA	U	U	U
Bromoform	4.7	4.7	U	U	U	U	U	U	U	U	U	NA	U	U	U
1,1,1-Trichloroethane	3.8	3.8	U	U	U	U	U	U	U	U	U	NA	U	U	U
1,1,2-Trichloroethane	5.0	5.0	U	U	U	U	U	U	U	U	U	NA	U	U	U

continued on next page (see last page for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO INCINERATOR FACILITY

Dames and Moore Sample Number			SC-3-5	SC-3-15	SC-3-40	1DUP100591	SC-7-5	SC-5-5	SC-5-15	SC-5-40	2DUP100991	SC-2-40	2FB100991	TB100791	TB100991
Laboratory Sample Number			HA6102	HA6103	HA6104	HA6105	HA6106	HA6396	HA6399	HA6400	HA6404	HA6406	HA6108	HA6113	HA6114
Sampling Date	Quant	Quant	10/5/91	10/5/91	10/5/91	10/5/91	10/5/91	10/9/91	10/9/91	10/9/91	10/9/91	10/9/91	10/9/91	10/7/91	10/9/91
Dilution Factor	Limit	Limit	1.2	1.2	1.1	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.0	1.0	1.0
Units	ug/L	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/L	ug/L	ug/L
APPENDIX IX P/T VOLATILE COMPOUNDS (continued)															
Trichloroethene	1.9	1.9	U	U	U	U	U	U	U	U	U	NA	U	U	U
Trichlorofluoromethane	10	10	U	U	U	U	U	U	U	U	U	NA	U	U	U
1,2,3-Trichloropropene	10	10	U	U	U	U	U	U	U	U	U	NA	U	U	U
Vinyl Chloride	10	10	U	U	U	U	U	U	U	U	U	NA	U	U	U
Acetone	10	10	U	U	U	U	U	U	U	U	U	NA	U	U	U
Ethylbenzene	7.2	7.2	U	U	U	U	U	U	U	U	U	NA	U	U	U
2-Hexanone	10	10	U	U	U	U	U	U	U	U	U	NA	U	U	U
Methyl isobutyl ketone	10	10	U	U	U	U	U	U	U	U	U	NA	U	U	U
Styrene	10	10	U	U	U	U	U	U	U	U	U	NA	U	U	U
Vinyl acetate	10	10	U	U	U	U	U	U	U	U	U	NA	U	U	U
m-Xylene	10	10	U	U	U	U	U	U	U	U	U	NA	U	U	U
o,p-Xylenes	10	10	U	U	U	U	U	U	U	U	U	NA	U	U	U

continued on next page (see last page for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO INCINERATOR FACILITY

Dames and Moore Sample Number			8C-3-5	8C-3-15	8C-3-40	10DUP100591	8C-7-5	8C-5-5	8C-5-15	8C-5-40	2DUP100991	8C-2-40	2FB100991
Laboratory Sample Number			HA6102	HA6103	HA6104	HA6105	HA6106	HA6398	HA6399	HA6400	HA6404	HA6405	HA6106
Sampling Date	Quant	Quant	10/5/91	10/5/91	10/5/91	10/5/91	10/5/91	10/9/91	10/9/91	10/9/91	10/9/91	10/9/91	10/9/91
Dilution Factor	Limit	Limit	1.2	1.2	1.1	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.0
Units	ug/L	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/L
APPENDIX IX SEMIVOLATILE COMPOUNDS													
Acetophenone	10	1000	U	U	U	U	U	U	U	U	U	U	U
2-Acetylaminofluorene	10	1000	U	U	U	U	U	U	U	U	U	U	U
4-Aminobiphenyl	10	1000	R	R	R	R	R	R	R	R	R	R	R
Aniline	10	1000	U	U	U	U	U	U	U	U	U	U	U
Aramite	10	1000	U	U	U	U	U	U	U	U	U	U	U
Benzo(A)anthracene	8.0	790	U	U	U	U	U	U	U	U	U	U	U
Benzo(b)fluoranthene	4.9	490	U	U	U	U	U	U	U	U	U	U	U
Benzo(a)pyrene	2.6	250	U	U	U	U	U	U	U	U	U	U	U
Bis(2-Chloroethoxy)methane	5.5	540	U	U	U	U	U	U	U	U	U	U	U
Bis(2-chloroethyl) ether	5.9	580	U	U	U	U	U	U	U	U	U	U	U
Bis(2-chloroisopropyl)ether	5.9	580	U	U	U	U	U	U	U	U	U	U	U
Bis(2-Ethylhexyl)phthalate	10	1000	6140 B	7370	3870	7250	11000	6640	4120	4450	4480	U	U
4-Bromophenylphenyl ether	2.0	190	U	U	U	U	U	U	U	U	U	U	U
Butylbenzylphthalate	10	1000	U	U	U	U	U	U	U	U	U	U	U
2-sec-Butyl-4,6-dinitrophenol	10	1000	U	U	U	U	U	U	U	U	U	U	U
p-Chloroaniline	10	1000	U	U	U	U	U	U	U	U	U	U	U
p-Chloro-m-cresol	3.1	300	U	U	U	U	U	U	U	U	U	U	U
2-Chloronaphthalene	2.0	190	U	U	U	U	U	U	U	U	U	U	U
2-Chlorophenol	3.4	330	U	U	U	U	U	U	U	U	U	U	U
Chrysene	2.6	250	U	U	U	U	U	U	U	U	U	U	U
Acenaphthene	2.0	190	U	U	U	U	U	U	U	U	U	U	U
Acenaphthylene	3.6	350	U	U	U	U	U	U	U	U	U	U	U
Anthracene	2.0	190	U	U	U	U	U	U	U	U	U	U	U
Benzo(ghi)perylene	3.2	415	U	U	U	U	U	U	U	U	U	U	U
Benzo(k)fluoranthene	2.6	250	U	U	U	U	U	U	U	U	U	U	U
Fluorene	2.0	190	U	U	U	U	U	U	U	U	U	U	U
Phenanthrene	5.6	550	BMDL	U	BMDL	U	U	U	U	BMDL	U	U	U
Pyrene	2.0	190	U	U	U	U	U	U	U	U	U	U	U
2-Nitrophenol	3.7	365	U	U	U	U	U	U	U	U	U	U	U
o-Cresol	10	1000	U	U	U	U	U	U	U	U	U	U	U
m+p-Cresols	10	1000	U	U	U	U	U	U	U	U	U	U	U
Diallate	10	1000	U	U	U	U	U	U	U	U	U	U	U
Dibenzo(a,h)anthracene	2.6	250	U	U	U	U	U	U	U	U	U	U	U
Di-n-butyl phthalate	10	1000	9540 J	1900 J	17800 J	12000 J	3970 J	3980 J	8510 J	15200 J	14900 J	U	U
1,2-Dichlorobenzene	2.0	190	U	U	U	U	U	U	U	U	U	U	U
1,3-Dichlorobenzene	2.0	190	U	U	U	U	U	U	U	U	U	U	U
1,4-Dichlorobenzene	4.5	450	U	U	U	U	U	U	U	U	U	U	U
3,3-Dichlorobenzidine	17	1675	U	U	U	U	U	U	U	U	U	U	U
2,4-Dichlorophenol	2.8	275	U	U	U	U	U	U	U	U	U	U	U
2,6-Dichlorophenol	10	1000	U	U	U	U	U	U	U	U	U	U	U

continued on next page (see last page for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO INCINERATOR FACILITY

Dames and Moore Sample Number	Quant Limit	Quant Limit	8C-3-5 HA6102 10/5/91 1.2 ug/kg	8C-3-15 HA6103 10/5/91 1.2 ug/kg	8C-3-40 HA6104 10/5/91 1.1 ug/kg	1DUP100991 HA6105 10/5/91 1.2 ug/kg	8C-7-5 HA6106 10/5/91 1.2 ug/kg	8C-5-5 HA6398 10/9/91 1.2 ug/kg	8C-5-15 HA6399 10/9/91 1.2 ug/kg	8C-5-40 HA6400 10/9/91 1.2 ug/kg	2DUP100991 HA6404 10/9/91 1.2 ug/kg	8C-2-40 HA6406 10/9/91 1.2 ug/kg	2FB100991 HA6108 10/9/91 1.0 ug/L
Sampling Date													
Dilution Factor													
Units	ug/L	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/L
APPENDIX IX SEMIVOLATILE COMPOUNDS (continued)													
Diethyl-phthalate	10	1000	U	U	U	U	U	U	U	U	U	U	U
p-Dimethylaminoazobenzene	10	1000	U	U	U	U	U	U	U	U	U	U	U
7,12-Dimethylbenzo(a)anthra	10	1000	U	U	U	U	U	U	U	U	U	U	U
3,3-Dimethylbenzidine	10	1000	U	U	U	U	U	U	U	U	U	U	U
a-a-Dimethylphenethylamine	-	-	U	U	U	U	U	U	U	U	U	U	U
2,4-Dimethylphenol	2.6	275	U	U	U	U	U	U	U	U	U	U	U
Dimethyl phthalate	10	1000	U	U	U	U	U	U	U	U	U	U	U
m-Dinitrobenzene	10	1000	U	U	U	U	U	U	U	U	U	U	U
4,6-Dinitro-0-cresol	25	2400	U	U	U	U	U	U	U	U	U	U	U
2,4-Dinitrophenol	43	4250	U	U	U	U	U	U	U	U	U	U	U
2,4-Dinitrotoluene	5.9	580	U	U	U	U	U	U	U	U	U	U	U
2,6-Dinitrotoluene	2.0	190	U	U	U	U	U	U	U	U	U	U	U
Di-n-octyl phthalate	10	1000	U	U	U	U	U	U	U	U	U	U	U
Diphenylamine	10	1000	U	U	U	U	U	U	U	U	U	U	U
N-nitrosodipropylamine	10	1000	U	U	U	U	U	U	U	U	U	U	U
Ethyl methanesulfonate	10	1000	U	U	U	U	U	U	U	U	U	U	U
Fluoranthene	2.3	225	U	U	U	U	U	U	U	U	U	U	U
Hexachlorobenzene	2.0	190	U	U	U	U	U	U	U	U	U	U	U
Hexachlorobutadiene	0.93	90	U	U	U	U	U	U	U	U	U	U	U
Hexachlorocyclopentadiene	10	1000	U	U	U	U	U	U	U	U	U	U	U
Hexachloroethane	1.6	165	U	U	U	U	U	U	U	U	U	U	U
Isodrin	6.1	1000	U	U	U	U	U	U	U	U	U	U	U
Hexachlorophene	10	1000	R	R	R	R	R	R	R	R	R	R	R
Hexachloropropene	10	1000	U	U	U	U	U	U	U	U	U	U	U
Indeno(1,2,3-c,d)pyrene	3.6	365	U	U	U	U	U	U	U	U	U	U	U
Isosafrole	10	600	U	U	U	U	U	U	U	U	U	U	U
Methapyrene	-	-	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
3-Methylcholanthrene	5.7	555	U	U	U	U	U	U	U	U	U	U	U
Methyl methanesulfonate	10	1000	U	U	U	U	U	U	U	U	U	U	U
Naphthalene	1.6	165	U	U	U	U	U	U	U	U	U	U	U
1,4-Naphthoquinone	10	1000	U	U	U	U	U	U	U	U	U	U	U
1-Naphthylamine	10	1000	U	U	U	U	U	U	U	U	U	U	U
2-Naphthylamine	10	1000	U	U	U	U	U	U	U	U	U	U	U
p-Nitroaniline	10	1000	U	U	U	U	U	U	U	U	U	U	U
Nitrobenzene	2.0	190	U	U	U	U	U	U	U	U	U	U	U
4-Nitrophenol	2.5	240	U	U	U	U	U	U	U	U	U	U	U
4-Nitroquinoline-N-oxide	-	-	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
N-Nitrosodiphenylamine	2.0	190	U	U	U	U	U	U	U	U	U	U	U
N-Nitrosodi-n-butylamine	10	1000	U	U	U	U	U	U	U	U	U	U	U
N-Nitrosodimethylamine	10	1000	U	U	U	U	U	U	U	U	U	U	U
N-Nitrosomethylethylamine	10	1000	U	U	U	U	U	U	U	U	U	U	U

continued on next page (see last page for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO INCINERATOR FACILITY

Dames and Moore Sample Number	Quant Limit	Quant Limit	SC-3-5 HA6102 10/5/91 1.2 ug/kg	SC-3-15 HA6103 10/5/91 1.2 ug/kg	SC-3-40 HA6104 10/5/91 1.1 ug/kg	1DUP100991 HA6105 10/5/91 1.2 ug/kg	SC-7-5 HA6106 10/5/91 1.2 ug/kg	SC-5-5 HA6396 10/9/91 1.2 ug/kg	SC-5-15 HA6399 10/9/91 1.2 ug/kg	SC-5-40 HA6400 10/9/91 1.2 ug/kg	2DUP100991 HA6404 10/9/91 1.2 ug/kg	SC-2-40 HA6405 10/9/91 1.2 ug/kg	2FB100991 HA6106 10/9/91 1.0 ug/l
Laboratory Sample Number													
Sampling Date													
Dilution Factor													
Units	ug/l	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/l
APPENDIX IX SEMIVOLATILE COMPOUNDS (continued)													
N-Nitrosomorpholine	10	1000	U	U	U	U	U	U	U	U	U	U	U
N-Nitrosopiperidine	10	1000	U	U	U	U	U	U	U	U	U	U	U
N-Nitrosopyrrolidine	10	1000	U	U	U	U	U	U	U	U	U	U	U
5-Nitro-o-toluidine	10	1000	U	U	U	U	U	U	U	U	U	U	U
Pentachlorobenzene	10	1000	U	U	U	U	U	U	U	U	U	U	U
Pentachloronitrobenzene	10	1000	U	U	U	U	U	U	U	U	U	U	U
Pentachlorophenol	3.7	365	U	U	U	U	U	U	U	U	U	U	U
Phenacetin	10	1000	U	U	U	U	U	U	U	U	U	U	U
Phenol	1.5	150	U	U	U	U	U	U	U	U	U	U	U
m-phenylenediamine	10	1000	U	U	U	U	U	U	U	U	U	U	U
o-phenylenediamine	10	1000	U	U	U	U	U	U	U	U	U	U	U
p-phenylenediamine	10	1000	U	U	U	U	U	U	U	U	U	U	U
2-Picoline	10	1000	U	U	U	U	U	U	U	U	U	U	U
Pronamide	10	1000	U	U	U	U	U	U	U	U	U	U	U
Pyridine	10	1000	U	U	U	U	U	U	U	U	U	U	U
Safrole	10	1000	U	U	U	U	U	U	U	U	U	U	U
1,2,4,5-Tetrachlorobenzene	10	1000	U	U	U	U	U	U	U	U	U	U	U
2,3,4,6-Tetrachlorophenol	10	1000	U	U	U	U	U	U	U	U	U	U	U
Tetraethyldithiopyrophospha	-	-	U	U	U	U	U	U	U	U	U	U	U
o-Toluidine	10	1000	U	U	U	U	U	U	U	U	U	U	U
1,2,4-Trichlorobenzene	2.0	190	U	U	U	U	U	U	U	U	U	U	U
2,4,5-Trichlorophenol	10	1000	U	U	U	U	U	U	U	U	U	U	U
2,4,6-Trichlorophenol	2.8	275	U	U	U	U	U	U	U	U	U	U	U
0,0,0-Triethyl phosphorothl	-	-	-	-	-	-	-	-	-	-	-	-	-
sym-Trinitrobenzene	-	-	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND	IND
Benzyl alcohol	10	1000	U	U	U	U	U	U	U	U	U	U	U
Dibenzofuran	10	1000	U	U	U	U	U	U	U	U	U	U	U
Isophorone	2.3	225	U	U	U	U	U	U	U	U	U	U	U
2-Methylnaphthalene	10	1000	BMDL	BMDL	BMDL	BMDL	U	U	U	BMDL	U	U	U
o-Nitroaniline	10	1000	U	U	U	U	U	U	U	U	U	U	U
m-Nitroaniline	10	1000	U	U	U	U	U	U	U	U	U	U	U
4-Chlorophenyl phenyl ether	4.3	425	U	U	U	U	U	U	U	U	U	U	U

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TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO INCINERATOR FACILITY

Dames and Moore Sample Number Laboratory Sample Number Sampling Date Units	Quant Limit ug/L	Quant Limit ug/kg	SC-3-5 HA6102 10/5/91 ug/kg	SC-3-15 HA6103 10/5/91 ug/kg	SC-3-40 HA6104 10/5/91 ug/kg	1DUP10059 HA6105 10/5/91 ug/kg	SC-7-5 HA6106 10/5/91 ug/kg	SC-5-5 HA6398 10/9/91 ug/kg	SC-5-15 HA6399 10/9/91 ug/kg	SC-5-40 HA6400 10/9/91 ug/kg	2DUP10099 HA6404 10/9/91 ug/kg
INORGANIC PARAMETERS (METALS)											
Antimony	60	6000	U	U	U	U	U	U	U	U	U
Arsenic	10	1000	9800	13000	9400	9800	8200	5100	18000	10000	7800
Barium	20	2000	37000	32000	21000	38000	46000	49000	16000	25000	55000
Beryllium	1.0	100	740	740	560	750	730	760	610	580	870
Cadmium	2.0	200	1800	2000	1800	1900	1900	1500	2000	1900	1900
Chromium	10	1000	17000	17000	13000	17000	18000	19000	11000	14000	22000
Cobalt	20	2000	15000	15000	12000	13000	11000	10000	13000	12000	12000
Copper	10	1000	49000	42000	38000	39000	27000	23000	44000	34000	26000
Lead	5.0	500	23000	24000	21000	27000	16000	13000	22000	20000	15000
Mercury	0.20	80	BMDL	U	BMDL	BMDL	BMDL	100	BMDL	BMDL	BMDL
Nickel	20	1000	41000	40000	32000	35000	31000	27000	34000	31000	31000
Selenium	5.0	500	BMDL J	BMDL J	U	BMDL J	U	BMDL J	BMDL J	BMDL J	BMDL J
Silver	10	1000	BMDL	BMDL	BMDL	BMDL	BMDL	BMDL	BMDL	BMDL	BMDL
Thallium	10	1000	BMDL J	1500	BMDL	BMDL	BMDL	U	1700	BMDL	BMDL
Tin	50	5000	28000	28000	27000	30000	30000	29000	32000	27000	30000
Vanadium	20	2000	25000	24000	17000	24000	23000	24000	17000	18000	27000
Zinc	20	2000	58000	100000	64000	60000	56000	48000	64000	80000	63000

LEGEND:

- U Compound was not detected at laboratory method detection limit.
  - J Estimated value due to limitations identified during the quality assurance review.
  - UJ eported method detection limit is estimated due to limitations identified during the quality assurance review.
  - B Compound was detected in a laboratory and/or field blank at similar concentrations. May represent laboratory and/or field contamination.
  - R Unreliable result. Compound may or may not be present.
  - \* Sample analyzed at multiple dilutions. Summary table is a hybrid of diluted and undiluted results.
  - No standard available. Compound was qualitatively searched for.
  - IND Indeterminate. Standard and/or spikes could not be detected at method detection limit.
  - BMDL Below Method Detection Limit reported by laboratory.
- Discrepancies may exist between the laboratory data tables and the data validation summary tables due to variations in the rounding of calculations.



**DATA VALIDATION/QUALITY ASSURANCE REVIEW  
PHASE II RCRA FACILITY INVESTIGATION  
CHEM WASTE MANAGEMENT, INC. - CHICAGO INCINERATOR  
SAMPLE COLLECTION DATES: OCTOBER 22 through OCTOBER 24, 1991  
DAMES & MOORE JOB NO.: 13963-055-192**

**LABORATORY REPORT Nos.: 101386, 101392 & 101396**

**INTRODUCTION**

Seventeen (17) soil samples, plus one (1) field duplicate, one (1) groundwater sample, one (1) field-blank sample and three (3) trip-blank samples were collected and submitted to Environmental Testing Corporation (ETC) of Edison, New Jersey (1992 Illinois Certification No. 100224). All samples included in this review are listed on Table 1. All soil samples and the associated field-blank sample were analyzed for priority pollutant volatile organic compounds, semivolatile organic compounds (base/neutral and acid extractable compounds) and metals. The two (2) associated trip-blank samples were analyzed for priority pollutant volatile organic compounds only. The groundwater sample was analyzed for priority pollutant volatile compounds, semivolatile compounds, RCRA Appendix IX organic compounds and priority pollutant metals. The trip-blank associated with this groundwater sample was analyzed for both priority pollutant volatile organic compounds and Appendix IX Heated Purge and Trap (HP/T) volatile organic compounds. All samples were analyzed following USEPA SW-846 Methodologies.

A data validation/quality assurance review was performed on all samples prepared under a modified CLP-SOW 3/90 CLP-I data deliverable format. Data were examined to assess the usability of the results, as well as to assess compliance relative to data package deliverable requirements. The organic data review is based upon a rigorous review of the reported hold times, surrogate recoveries, blank spike recoveries, matrix spike and matrix spike duplicate summaries, blank contaminants, internal standard area performance, Gas Chromatography/Mass Spectroscopy (GC/MS) tuning and calibration data.

The inorganic data review is based on a review of the reported hold times, blank analysis results, blank spike recoveries, matrix spike and duplicate results, instrument calibration verification results, post-digestion spike recoveries and Inductively Coupled Plasma (ICP) serial dilution analysis.

Details of the data validation/quality assurance review are presented in the narrative section of the report. The data is summarized on Table 2 of the report. Data qualifiers have been placed next to the results so that the data user can quickly assess the qualitative and/or quantitative reliability of the reported result. This report

Quality assurance reviews of laboratory-generated data routinely identify problems associated with analytical measurements, even from the most experienced and capable laboratories.

This review has been performed in accordance with the requirements specified in the "Laboratory Data Validation Functional Guidelines for Evaluating Organic Analyses" dated February 1988 and "Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses" dated July 1988.

**TABLE 1**  
**SAMPLES INCLUDED IN REVIEW**

<u>Sample ID</u>	<u>Lab ID</u>	<u>Date Collected</u>	<u>Test Requested</u>
<u>Log Link No. 101386</u>			
SFG-4S	HA6455	10/22/91	PP VOA, PP BNA & PP Metals
SFG-10D	HA6457	10/22/91	PP VOA, PP BNA & PP Metals
SFG-4D	HA6461	10/22/91	PP VOA, PP BNA & PP Metals
TB-102291	HA6115	10/22/91	PP VOA
<u>Log Link No. 101392</u>			
SFILLDUP01	HA6463	10/23/91	PP VOA, PP BNA & PP Metals
SFG-3S	HA6464	10/23/91	PP VOA, PP BNA & PP Metals
SFG-3D	HA6465	10/23/91	PP VOA, PP BNA & PP Metals
SFG-2S	HA6466	10/23/91	PP VOA, PP BNA & PP Metals
SFG-2D	HA6470	10/23/91	PP VOA, PP BNA & PP Metals
SFG-1S	HA6476	10/23/91	PP VOA, PP BNA & PP Metals
SFG-1D	HA6477	10/23/91	PP VOA, PP BNA & PP Metals
SFG-7S	HA6478	10/23/91	PP VOA, PP BNA & PP Metals
SFG-7D	HA6479	10/23/91	PP VOA, PP BNA & PP Metals
SFG-8S	HA6481	10/23/91	PP VOA, PP BNA & PP Metals
SFG-8D	HA6482	10/23/91	PP VOA, PP BNA & PP Metals
TB-102391	HA6116	10/23/91	PP VOA
<u>Log Link No. 101396</u>			
SFG-9S	HA6485	10/24/91	PP VOA, PP BNA & PP Metals
SFG-9D	HA6486	10/24/91	PP VOA, PP BNA & PP Metals
SFG-17S	HA6487	10/24/91	PP VOA, PP BNA & PP Metals
SFG-17D	HA6488	10/24/91	PP VOA, PP BNA & PP Metals
FB-102491	HA6506	10/24/91	PP VOA, PP BNA & PP Metals
FG-10GW	HA6528	10/22/91	Appendix IX HP/T VOA, P/T VOA, BNA & Metals
<u>Log Link No. 101396 (continued)</u>			

TB-102491

HA6555

10/24/91

Appendix IX HP/T VOA & P/TVOA

Legend:

PP VOA	=	Priority Pollutant Volatile Organic Compounds
PP BNA	=	Priority Pollutant Semivolatile Organic Compounds (Base/Neutral and Acid-Extractable Compounds)
Appendix IX	=	Heated Purge and Trap RCRA Volatile Organic Compounds and RCRA Semivolatile Organic Compounds
PP Metals	=	Priority Pollutant Metals

GENERAL COMMENTS

With regard to the data package deliverables, most of the requirements were met with the exception of the metals fraction. This reviewer has observed that for the ICP concentrations reported at 10 to 15 times above the method detection limit (MDL), the data validation cannot reproduce the laboratory reported results. The calculation obtained during data validation is consistently higher than the laboratory reported concentration. This is due to the fact that the interelement correction factors in the ICP instrument have been externally calculated in the system. Since this external interelement correction factor is not available for review, the reported results for low level samples cannot be reproduced. It should be noted that positive ICP reported results that are significantly above than the MDL (approximately 100 times higher or more) were reproduced and validated, since this interelement correction factor becomes negligible at higher concentrations. It is this reviewer's opinion that data usability is not impacted. The data review assumes that the low level reported concentrations (10 to 15 times the MDL) are correct as reported.

DATA QUALIFIERS

Overall, the data quality is good. The data validation review has identified aspects of the analytical data that require qualification. To confidently use any of the data within the data set, the data user should understand the limitations and qualifications presented. With regard to data usability, the following qualifiers are offered based upon the data provided.

ORGANIC QUALIFIERS

Hold Times:

- All samples were analyzed and/or extracted within the required hold time criteria for all organic parameters.

#### Blank Contamination:

- Due to the presence of di-n-butyl phthalate and bis(2-ethylhexyl)phthalate in the semivolatile laboratory blank, the positive results of these compounds in all field samples are qualitatively questionable and have been flagged (B) on the summary table.

#### Surrogate Recoveries:

- The volatile surrogates, toluene-d8 and bromofluorobenzene (BFB), were recovered outside the control limits (low) for sample SFG-8S. The sample was reanalyzed with these surrogates outside the control limits (low) which may indicate matrix effects. The initial analysis was deemed usable by the laboratory and has been reported for review. The positive and non-detected results for both the initial and re-analysis may be biased low and have been flagged (J/UJ) estimated on the summary tables.
- All priority pollutant and Appendix IX base/neutral/acid extractable surrogate compound recoveries are reported within control limits for all samples.

#### Internal Standards Area Counts:

- All volatile internal standard area counts and retention times were reported within control limits for all samples.
- The area count of the semivolatile internal standard, perylene-d12, was reported outside the control limits (low) for samples SFG-1D, SFG-7D and SFG-9S. The positive and non-detected compounds quantitated against this internal standard may be biased low and have been flagged (J/UJ) estimated on the summary tables.

#### Matrix Spike and Matrix Spike Duplicate (MS/MSD) Summary:

- The volatile spiking compound, trans-1,2-dichloroethene, was recovered outside the control limits (high) for sample SFG-8D. No qualifier has been applied in the unspiked sample since this compound was reported as non-detected.
- The volatile spiking compound, vinyl chloride, was not recovered in the spiked sample SFG-8D. No qualifier has been applied since the concentration of this compound in the unspiked sample is greater than 4 times the spike-added concentration.

- The base/neutral spiking compound, 2,4-dinitrotoluene, was recovered outside the control limits (high) for samples SFG-8DMS/MSD and SFG-17DMS/MSD and may be biased high. No qualifier has been applied since this compound was non-detected in the unspiked samples.
- The acid-extractable spiking compounds, 2-chlorophenol and phenol, were recovered outside the control limits (low) for the associated blank spike. The positive and non-detected results of these compounds may be biased low in all field samples may be biased low and have been flagged (J/UJ) estimated on the summary table.
- Sample SFILLDUP01 was collected and submitted to the laboratory as a blind field duplicate of sample SFG-7S. The reproducibility of the positive organic results are poor, which may be due to the non-homogeneous nature of the sample matrix. The positive results of both samples SFILLDUP01 and SFG-7S are regarded as estimated values and have been flagged (J) on the summary tables.

#### Initial and Continuing Calibrations:

- Samples SFG-2D, SFG-9S and SFG-9D were reanalyzed at elevated dilutions for volatile organic compounds due to target compound concentrations exceeding the linear calibration range requirements. The results reported on the summary table (Table 2) of these samples are a hybrid of both the initial and dilution analyses.
- Due to the high percent difference between the initial and continuing calibration response factors, all positive results for the following volatile compounds have been flagged (J) estimated. The actual detection limits may be higher than reported and have been flagged (UJ) estimated on the summary table.

<u>Compound</u>	<u>Log Link</u>	<u>Associated Sample</u>
Methylene Chloride	101386	All Samples
	101392	SFG-3D, SFG-2S, SFG-7S, SFG-7D & SFG-8D
	101396	SFG-9S, SFG-9D, FG-10GW & TB-102491
Acetone & Carbon Disulfide	101396	FG-10GW & TB-102491

- In the heated purge and trap (HP/T) volatile organic analysis, the percent differences between the initial and continuing calibration response factors of all compounds are greater than 25%. The non-

detected HP/T volatile results for samples FG-10GW and TB-102491 are regarded as estimated values and have been flagged (UJ) on the summary table.

- Due to the high difference between the initial and continuing calibration response factors, all positive results for the following semivolatile compounds have been flagged (J) estimated. The actual detection limits may be higher than reported and have been flagged (UJ) estimated on the summary table.

<u>Compound</u>	<u>Log Link</u>	<u>Associated Sample</u>
2,4-Dinitrophenol & 4-Nitrophenol	101392	SFG-3D, SFG-2S, SFG-2D, SFG-1S, SFG-1D, SFG-7S, SFG-7D & SFG- 8S
	101396	SFG-9S & SFG-17S
Indeno(c,d)pyrene	101396	FB-10GW & FB-102491

- The response factor of the Appendix IX semivolatile compound, hexachlorophene, in the continuing calibration associated with sample FG-10GW is less than 0.05. The non-detected result of this compound for sample FG-10GW is regarded as unusable and have been flagged (R) on the summary table.

#### Additional Comments:

- As per the requirements, all values calculated below the method detection limit should be considered estimated and have been flagged (J) on the data table.

#### INORGANIC PARAMETER QUALIFIERS

##### Hold Times:

- All samples were digested and analyzed within the required hold time criteria for priority pollutant metals analyses.

##### Blank Contamination:

- Trace presence of mercury has been identified in the laboratory blank. The positive mercury results that have been reported below the method detection limits (BMDL) are qualitatively questionable. These results have been flagged (U) non-detected since this positive result may be attributed to laboratory blank contamination. The positive mercury



results reported above the method detection limit (MDL) are regarded as "real" and no qualifier has been applied.

#### Instrument Calibration and Verification:

- The initial and continuing calibration verification recoveries of all priority pollutant metals were reported within control limits.

#### ICP Serial Dilution:

- In the ICP serial dilution, the percent differences (%D) of chromium, nickel and zinc are outside the control limits for sample SFG-17D. The positive results of these analytes in all field samples are regarded as estimated values and have been flagged (J) on the summary table.

#### Matrix Spike and Duplicate Summary:

- Sample SFILLDUP01 was collected and submitted to the laboratory as a blind field duplicate of sample SFG-7S. The reproducibility of the positive metals results are poor, which may be due to the non-homogeneous nature of the sample matrix. The positive analyte results of both samples SFILLDUP01 and SFG-7S are regarded as estimated values and have been flagged (J) on the summary tables.
- Due to the low spike recoveries of antimony and chromium in sample SFG-8D, the positive and/or non-detected results of these analytes in the unspiked sample may be biased low have been flagged (J/UJ) estimated.
- The matrix spike recovery of copper for sample SFG-8D was greater than 200%. The positive copper result in the unspiked sample is regarded as unreliable and has been flagged (R) on the summary table.
- Due to the high relative percent differences (RPD) associated with the duplicate analyses of arsenic, selenium, thallium, chromium, lead and zinc in sample SFG-8D, the positive results have been flagged (J) estimated.
- The matrix spike recoveries of arsenic, chromium and antimony were outside the control limits (low) for sample SFG-17D. The positive and non-detected results of these analytes in the unspiked samples may be biased low and have been flagged (J/UJ) estimated.

### Post-Digestion Spike Recoveries:

- The post-spike recoveries of the following analytes were recovered outside the control limits (low). Positive and/or non-detected results of these analytes for the associated samples may be biased low and have been flagged (J) estimated.

<u>Analyte</u>	<u>Log Link</u>	<u>Associated Sample</u>
Selenium	101386	All Samples
	101392	SFG-3D, SFG-2S, SFG-2D, SFG-1S, SFG-1D & SFG-7D
	101392	All Samples
Thallium	101386	All Samples
	101392	All Samples
	101396	All Samples Except for SFG-9D

### Additional Comments:

- The laboratory reports several inorganic results as below the method detection limit (BMDL). These are reported as BMDL on Table 2. The actual concentrations were not calculated during the data validation review since the interelement coefficient factors were not provided.

TABLE 2

SUMMARY OF ANALYTICAL RESULTS  
 PHASE II INVESTIGATION  
 CEMICAL WASTE MANAGEMENT  
 CHICAGO INCINERATOR FACILITY

Dames and Moore Sample Number			FG-10GW	TB102491
Laboratory Sample Number			HA6528	HA6555
Sampling Date	Quant	Quant	10/22/91	10/24/91
Dilution Factors	Limit	Limit	1.0	1.0
Units	ug/L	ug/Kg	ug/L	ug/L
HEATED P/T VOLATILE COMPOUNDS				
Acetonitrile	15	15	UJ	UJ
Acrolein	20	20	UJ	UJ
Acrylonitrile	10	10	UJ	UJ
1,4-Dioxane	300	300	UJ	UJ
Ethyl cyanide	40	40	UJ	UJ
Isobutyl alcohol	230	230	UJ	UJ
Methacrylonitrile	110	110	UJ	UJ

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number			FG-10GW	TB-102491
Laboratory Sample Number			HA6528	HA6555
Sampling Date	Quant	Quant	10/22/91	10/24/91
Dilution Factor	Limit	Limit	1.0	1.0
Units	ug/L	ug/Kg	ug/L	ug/L
APPENDIX IX VOLATILE COMPOUNDS				
Acetone	10	10	18.4 J	UJ
Benzene	4.4	4.4	3.1 J	U
Bromoform	4.7	4.7	U	U
Carbon disulfide	10	10	UJ	UJ
Carbon Tetrachloride	2.8	2.8	U	U
Chlorobenzene	6.0	6.0	U	U
2-Chloro-1,3-butadiene	-	-	U	U
Chlorodibromomethane	3.1	3.1	U	U
Chloroethane	10	10	U	U
Chloroform	1.6	1.6	U	U
Dichlorobromomethane	2.2	2.2	U	U
Dichlorodifluoromethane	10	10	U	U
1,2-Dibromo-3-chloropropane	10	10	U	U
1,2-Dibromoethane	10	10	U	U
1,4-Dichloro-2-butene	10	10	U	U
Dichlorodifluoromethane	10	10	U	U
1,1-Dichloroethane	4.7	4.7	U	U
1,2-Dichloroethane	2.8	2.8	U	U
1,1-Dichloroethene	2.8	2.8	1.4 J	U
1,2-Dichloropropane	6.0	6.0	U	U
cis-1,3-Dichloropropene	5.0	5.0	U	U
trans-1,3-Dichloropropene	10	10	U	U
Ethylbenzene	7.2	7.2	U	U
Ethyl methacrylate	10	10	U	U
2-Hexanone	10	10	U	U
Iodomethane	10	10	U	U
Methyl bromide	10	10	U	U
Methyl chloride	10	10	U	U
Methylene Chloride	2.8	2.8	UJ	UJ
Methyl isobutyl ketone	10	10	U	U
Methyl ethyl ketone	10	10	U	U
Methyl methacrylate	10	10	U	U

continued next page (see last page of table for notes)

TABLE 2 (Continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CEMICAL WASTE MANAGEMENT  
CHICAGO INCINERATOR FACILITY

Dames and Moore Sample Number			FG-10GW	TB-102491
Laboratory Sample Number			HA6528	HA6555
Sampling Date	Quant	Quant	10/22/91	10/24/91
Dilution Factor	Limit	Limit	1.0	1.0
Units	ug/L	ug/Kg	ug/L	ug/L
APPENDIX IX VOLATILE COMPOUNDS (continued)				
Pentachloroethane	—	—	U	U
Styrene	10	10	U	U
1,1,2,2-Tetrachloroethane	4.1	4.1	U	U
Tetrachloroethene	4.1	4.1	U	U
Toluene	6.0	6.0	3.4 J	U
1,2-Dichloroethene (trans)	1.6	1.6	U	U
1,1,1-Trichloroethane	3.8	3.8	U	U
1,1,2-Trichloroethane	5.0	5.0	U	U
1,2,3-Trichloropropane	10	10	U	U
Trichloroethene	1.9	1.9	U	U
Trichlorofluoromethane	10	10	U	U
Vinyl acetate	10	10	U	U
Vinyl Chloride	10	10	U	U
m-Xylene	10	10	U	U
o,p-Xylenes	10	10	U	U

continued next page (see last page of table for notes)

TABLE 2  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number Laboratory Sample Number Sampling Date Dilution Factor Units	Quant Limit ug/L	Quant Limit ug/Kg	FG-10GW HA6528 10/22/91 1.0 ug/L
APPENDIX IX BASE/NEUTRAL EXTRACTABLE COMPOUNDS			
Acetophenone	19	19	U
2-Acetylaminofluorene	19	19	U
4-Aminobiophenyl	19	19	U
Aniline	19	19	U
Aramite	19	19	U
Benzo(A)anthracene	15	15	U
Benzo(b)fluoranthene	9.2	9.2	U
Benzo(a)pyrene	4.8	4.8	U
Bis(2-Chloroethoxy)methane	10	10	U
Bis(2-chloroethyl) ether	11	11	U
Bis(2-chloroisopropyl) ether	11	11	U
Bis(2-Ethylhexyl)phthalate	19	19	U
4-Bromophenylphenyl ether	3.7	3.7	U
Butylbenzylphthalate	19	19	U
2-sec-Butyl-4,6-dinitrophen	19	19	U
p-Chloroaniline	19	19	U
p-Chloro-m-cresol	5.8	5.8	U
2-Chloronaphthalene	3.7	3.7	U
2-Chlorophenol	6.3	6.3	U
Chrysene	4.8	4.8	U
Acenaphthene	3.7	3.7	U
Acenaphthylene	6.7	6.7	U
Anthracene	3.7	3.7	U
Benzo(ghi)perylene	7.9	7.9	U
Benzo(k)fluoranthene	4.8	4.8	U
Fluorene	3.7	3.7	U
Phenanthrene	10	10	U
Pyrene	3.7	3.7	U
2-Nitrophenol	6.9	6.9	U
o-Cresol	19	19	U
m+p-Cresols	19	19	6.1 J
Diallate	19	19	U
Dibenzo(a,h)anthracene	4.8	4.8	U
Di-n-butyl phthalate	3.7	3.7	U
1,2-Dichlorobenzene	3.7	3.7	U
1,3-Dichlorobenzene	8.5	8.5	U
1,4-Dichlorobenzene	31.7	31.7	U
3,3-Dichlorobenzidine	5.2	5.2	U
2,4-Dichlorophenol	19	19	6.27
2,6-Dichlorophenol	19	19	6.5 J

continued next page (see last page of table for notes)

TABLE 2  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number	Quant	Quant	FG-10GW
Laboratory Sample Number	Limit	Limit	HA6528
Sampling Date	ug/L	ug/Kg	10/22/91
Dilution Factor			1.0
Units			ug/L
APPENDIX IX BASE/NEUTRAL EXTRACTABLE COMPOUNDS (cont)			
Diethyl-phthalate	19	19	U
p-Dimethylaminoazobenzene	19	19	U
7,12-Dimethylbenzo(a)anthra	19	19	U
3,3-Dimethylbenzidine	19	19	U
a-a-Dimethylphenethylamine	-	-	U
2,4-Dimethylphenol	5.2	5.2	U
Dimethyl phthalate	19	19	U
m-Dinitrobenzene	19	19	U
4,6-Dinitro-0-cresol	46	46	U
2,4-Dinitrophenol	81	81	U
2,4-Dinitrotoluene	11	11	U
2,6-Dinitrotoluene	3.7	3.7	U
Di-n-octyl phthalate	19	19	U
Diphenylamine	19	19	U
N-nitrosodipropylamine	19	19	U
Ethyl methanesulfonate	19	19	U
Fluoranthene	4.2	4.2	U
Hexachlorobenzene	3.7	3.7	U
Hexachlorobutadiene	1.7	1.7	U
Hexachlorocyclopentadiene	19	19	U
Hexachloroethane	3.1	3.1	U
Isodrin	11	11	U
Hexachlorophene	19	19	R
Hexachloropropene	19	19	U
Indeno(1,2,3-c,d)pyrene	7.1	7.1	U
Isosafrole	19	19	U
Methapyrilene	-	-	IND
3-Methylcholanthrene	11	11	U
Methyl methanesulfonate	19	19	U
Naphthalene	3.1	3.1	3.25
1,4-Naphthoquinone	11	11	U
1-Naphthylamine	19	19	U
2-Naphthylamine	19	19	U
p-Nitroaniline	19	19	U
Nitrobenzene	3.7	3.7	U
4-Nitrophenol	4.6	4.6	U
4-Nitroquinoline-N-oxide	-	-	IND
N-Nitrosodiphenylamine	3.7	3.7	U
N-Nitrosodi-n-butylamine	19	19	U
N-Nitrosodimethylamine	19	19	U
N-Nitrosomethylethylamine	19	19	U

continued next page (see last page of table for notes)

TABLE 2  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number	Quant	Quant	FG-10GW
Laboratory Sample Number	Limit	Limit	HA8528
Sampling Date	ug/L	ug/Kg	10/22/91
Dilution Factor			1.0
Units			ug/L
APPENDIX IX BASE/NEUTRAL EXTRACTABLE COMPOUNDS (cont)			
N-Nitrosomorpholine	19	19	U
N-Nitrosopiperidine	19	19	U
N-Nitrosopyrrolidine	19	19	U
5-Nitro-o-toluidine	19	19	U
Pentachlorobenzene	19	19	U
Pentachloronitrobenzene	19	19	U
Pentachlorophenol	6.9	6.9	U
Phenacetin	19	19	U
Phenol	2.9	2.9	56.1
m-phenylenediamine	19	19	U
o-phenylenediamine	19	19	U
p-phenylenediamine	19	19	U
2-Picoline	19	19	U
Pronamide	19	19	U
Pyridine	19	19	U
Safrole	19	19	U
1,2,4,5-Tetrachlorobenzene	19	19	U
2,3,4,6-Tetrachlorophenol	19	19	U
Tetraethyldithiopyrophospha	-	-	U
o-Toluidine	19	19	U
1,2,4-Trichlorobenzene	3.7	3.7	U
2,4,5-Trichlorophenol	19	19	U
2,4,6-Trichlorophenol	5.2	5.2	U
0,0,0-Triethyl phosphorothi	-	-	U
sym-Trinitrobenzene	-	-	U
Benzyl alcohol	19	19	U
Dibenzofuran	19	19	U
Isophorone	4.2	4.2	U
2-Methylnaphthalene	19	19	U
o-Nitroaniline	19	19	U
m-Nitroaniline	19	19	U
4-Chlorophenyl phenyl ether	8.1	8.1	U

continued next page (see last page of table for notes)



TABLE 2 (Continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CEMICAL WASTE MANAGEMENT  
CHICAGO INCINERATOR FACILITY

Dames and Moore Sample Number			SFG-4S	SFG-10D	SFG-4D	TB-102291	SFILLDUP01	SFG-3S	SFG-3D	SFG-2S	SFG-2D	SFG-1S
Laboratory Sample Number			HA6455	HA6457	HA6461	HA6115	HA6463	HA6464	HA6465	HA6466	HA6470	HA6476
Sampling Date	Quant	Quant	10/22/91	10/22/91	10/22/91	10/22/91	10/23/91	10/23/91	10/23/91	10/23/91	10/23/91	10/23/91
Dilution Factors	Limit	Limit	1.2	1.5	1.3	1.0	120	1.2	1.3	1.2	3.1	13
Units	ug/L	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/L	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
PP VOLATILE COMPOUNDS												
Benzene	5.0	5.0	6.48	2.4 J	U	U	6940	U	U	U	65.9	U
Bromoform	5.0	5.0	U	U	U	U	U	U	U	U	U	U
Carbon Tetrachloride	5.0	5.0	U	U	U	U	U	U	U	U	U	U
Chlorobenzene	5.9	5.9	U	1.6 J	U	U	U	U	U	U	23.9	U
Chlorodibromomethane	5.0	5.0	U	U	U	U	U	U	U	U	U	U
Chloroethane	10	10	U	U	U	U	U	U	U	U	U	U
2-Chloroethylvinyl ether	10	10	NA	NA	NA	NA	U	U	NA	NA	U	U
Chloroform	5.0	5.0	U	U	U	U	U	U	U	U	U	U
Dichlorobromomethane	5.0	5.0	U	U	U	U	U	U	U	U	U	U
Dichlorodifluoromethane	200	200	U	U	U	U	U	U	U	U	U	U
1,1-Dichloroethane	5.0	5.0	U	U	U	U	U	12.4	U	U	U	88.1
1,2-Dichloroethane	5.0	5.0	U	U	U	U	U	U	U	U	U	U
1,1-Dichloroethylene	5.0	5.0	53.6	2.6 J	9.18	U	5240	U	U	3.2 J	352*	832
1,2-Dichloropropane	5.9	5.9	U	U	U	U	U	U	U	U	U	U
cis-1,3-Dichloropropene	5.0	5.0	U	U	U	U	U	U	U	U	U	U
Ethylbenzene	7.2	7.2	U	U	U	U	5190	U	U	U	U	U
Methyl bromide	10	10	U	U	U	U	U	U	U	U	U	U
Methyl chloride	10	10	U	U	U	U	U	U	U	U	U	U
Methylene Chloride	5.0	5.0	U	U	U	U	1610	U	U	13.5 J	1040*	246
1,1,2,2-Tetrachloroethane	6.8	6.8	U	U	U	U	U	U	U	U	U	U
Tetrachloroethene	5.0	5.0	U	U	U	U	2.6 J	U	1.6 J	U	U	U
Toluene	5.9	5.9	U	4.4 J	2.8 J	U	14900	U	U	U	34.9	U
1,2-Dichloroethene (trans)	5.0	5.0	U	U	U	U	U	U	U	U	U	U
1,1,1-Trichloroethane	5.0	5.0	U	U	U	U	U	U	U	U	U	U
1,1,2-Trichloroethane	5.0	5.0	U	U	U	U	6840	U	U	U	32.5	U
Trichloroethylene	10	10	2.7 J	U	U	U	1.5 J	U	U	U	U	U
Trichlorofluoromethane	10	10	U	U	U	U	U	U	U	U	U	U
Vinyl Chloride	10	10	138	U	19.3	U	U	U	U	62.9	693*	1400
trans-1,3-Dichloropropene	10	10	U	U	U	U	U	U	U	U	U	U

continued next page (see last page of table for notes)

TABLE 2 (Continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CEMICAL WASTE MANAGEMENT  
CHICAGO INCINERATOR FACILITY

Dames and Moore Sample Number	Quant	Quant	SFG-1D	SFG-7S	SFG-7D	SFG-8S	SFG-8D	TB-102391	SFG-8S	SFG-8D	SFG-17S	SFG-17D
Laboratory Sample Number	Limit	Limit	HA6477	HA6478	HA6479	HA6481	HA6482	HA6116	HA6485	HA6486	HA6487	HA6488
Sampling Date	ug/L	ug/Kg	10/23/91	10/23/91	10/23/91	10/23/91	10/23/91	10/23/91	10/24/91	10/24/91	10/24/91	10/24/91
Dilution Factor	Units	Units	1.3	12	6.3	1.2	1.3	1.0	640	120	61	3.1
Units	ug/L	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/L	ug/Kg	ug/Kg	ug/Kg	ug/Kg
PP VOLATILE COMPOUNDS												
Benzene	5.0	5.0	U	670	48.8	U	116	U	9570	2920	877	58.2
Bromoform	5.0	5.0	U	U	U	U	U	U	U	U	U	U
Carbon Tetrachloride	5.0	5.0	U	U	U	U	U	U	U	U	U	U
Chlorobenzene	5.9	5.9	U	U	U	U	14.4	U	1500 J	700 J	135 J	9.6 J
Chlorodibromomethane	5.0	5.0	U	U	U	U	U	U	U	U	U	U
Chloroethane	10	10	U	U	U	U	U	U	U	U	U	U
2-Chloroethylvinyl ether	10	10	U	NA	NA	NA	NA	NA	U	U	U	U
Chloroform	5.0	5.0	U	U	U	U	U	U	U	U	U	U
Dichlorobromomethane	5.0	5.0	U	U	U	U	U	U	U	U	U	U
Dichlorodifluoromethane	200	200	U	U	U	U	U	U	U	U	U	U
1,1-Dichloroethane	5.0	5.0	U	U	U	U	U	U	U	U	U	U
1,2-Dichloroethane	5.0	5.0	U	U	U	U	U	U	U	U	U	U
1,1-Dichloroethylene	5.0	5.0	34.7	580	153	U	68.2	U	200000*	44400*	4860	450
1,2-Dichloropropane	5.9	5.9	U	U	U	U	U	U	U	U	U	U
cis-1,3-Dichloropropene	5.0	5.0	U	U	U	U	U	U	U	U	U	U
Ethylbenzene	7.2	7.2	U	64 J	U	U	U	U	4100 J	2070	U	U
Methyl bromide	10	10	U	U	U	U	U	U	U	U	U	U
Methyl chloride	10	10	U	U	U	U	U	U	U	U	U	U
Methylene Chloride	5.0	5.0	12.7	134 J	1010 J	U	8.23 J	U	69300 J	39900 J*	369	298
1,1,2,2-Tetrachloroethane	6.8	6.8	U	U	U	U	U	U	U	U	U	U
Tetrachloroethane	5.0	5.0	U	U	U	U	59.5	U	6390	2120	U	U
Toluene	5.9	5.9	U	544	39.2	U	73	U	11900	4620	2360	79.1
1,2-Dichloroethene (trans)	5.0	5.0	U	U	U	U	U	U	U	U	U	U
1,1,1-Trichloroethane	5.0	5.0	U	U	U	U	U	U	U	222 J	U	U
1,1,2-Trichloroethane	5.0	5.0	U	344	U	U	U	U	225000*	47600*	U	U
Trichloroethylene	10	10	U	U	U	U	16.8	U	10300	3340	U	U
Trichlorofluoromethane	10	10	U	U	U	U	U	U	U	U	U	U
Vinyl Chloride	10	10	28.9	2670	1240	U	55.6	U	U	U	U	1440
trans-1,3-Dichloropropene	10	10	U	U	U	U	U	U	U	U	U	U

continued next page (see last page of table for notes)

TABLE 2 (Continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CEMICAL WASTE MANAGEMENT  
CHICAGO INCINERATOR FACILITY

Dames and Moore Sample Number			SFG-4S	SFG-10D	SFG-4D	SFILLDUP01	SFG-3S	SFG-3D	SFG-2S	SFG-2D	SFG-1S	SFG-1D
Laboratory Sample Number			HA6455	HA6457	HA6461	HA6463	HA6464	HA6465	HA6466	HA6470	HA6476	HA6477
Sampling Date	Quant	Quant	10/22/91	10/22/91	10/22/91	10/23/91	10/23/91	10/23/91	10/23/91	10/23/91	10/23/91	10/23/91
Dilution Factor	Limit	Limit	1.2	1.5	1.3	1.2	1.2	1.3	1.2	3.1	13	1.3
Units	ug/L	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
PP ACID EXTRACTABLE COMPOUNDS												
2-Chlorophenol	390	390	U	U	U	U	U	U	U	U	U	U
2,4-Dichlorophenol	320	320	U	U	U	208 J	U	U	U	U	U	U
2,4-Dimethylphenol	320	320	U	U	U	U	U	U	295 J	U	U	U
4,6-Dinitro-2-methylphenol	2900	2900	U	U	U	U	U	U	U	U	U	U
2,4-Dinitrophenol	5000	5000	U	U	U	U	U	U	U	U	U	U
2-Nitrophenol	430	430	U	U	U	U	U	U	U	U	U	U
4-Nitrophenol	290	290	U	U	U	U	U	U	U	U	U	U
4-Chloro-3-methylphenol	360	360	U	U	U	U	U	U	U	U	U	U
Pentachlorophenol	430	430	U	U	U	U	U	U	U	U	U	U
Phenol	180	180	U	U	U	2390 J	U	U	U	469	U	217
2,4,6-Trichlorophenol	320	320	U	U	U	U	U	U	U	U	U	U

continued next page (see last page of table for notes)

TABLE 2 (Continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CEMICAL WASTE MANAGEMENT  
CHICAGO INCINERATOR FACILITY

Dames and Moore Sample Number Laboratory Sample Number Sampling Date Dilution Factor Units	Quant Limit ug/L	Quant Limit ug/Kg	SFG-7S HA6478 10/23/91 1.2 ug/Kg	SFG-7D HA6479 10/23/91 6.3 ug/Kg	SFG-8S HA6481 10/23/91 1.2 ug/Kg	SFG-8D HA6482 10/23/91 1.3 ug/Kg	SFG-8S HA6485 10/24/91 1.0 ug/Kg	SFG-9D HA6486 10/24/91 640 ug/Kg	SFG-17S HA6487 10/24/91 120 ug/Kg	SFG-17D HA6488 10/24/91 61 ug/Kg	FB-102491 HA6506 10/24/91 3.1 ug/L
PP ACID EXTRACTABLE COMPOUNDS											
2-Chlorophenol	390	390	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
2,4-Dichlorophenol	320	320	524 J	U	449	U	62700	U	3560	U	U
2,4-Dimethylphenol	320	320	UJ	U	220 J	U	U	U	290 J	U	U
4,6-Dinitro-2-methylphenol	2900	2900	UJ	U	U	U	U	U	U	U	U
2,4-Dinitrophenol	5000	5000	UJ	UJ	UJ	U	UJ	U	UJ	U	U
2-Nitrophenol	430	430	UJ	U	U	U	U	U	U	U	U
4-Nitrophenol	290	290	UJ	UJ	UJ	U	UJ	U	UJ	U	U
4-Chloro-3-methylphenol	360	360	UJ	U	U	U	U	U	U	U	U
Pentachlorophenol	430	430	UJ	U	887	U	774	U	U	U	U
Phenol	180	180	11000 J	1750	343	UJ	7290	UJ	9110	UJ	UJ
2,4,6-Trichlorophenol	320	320	UJ	U	U	U	668	U	U	U	U

continued next page (see last page of table for notes)

TABLE 2 (Continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CEMICAL WASTE MANAGEMENT  
CHICAGO INCINERATOR FACILITY

Dames and Moore Sample Number			SFG-4S	SFG-10D	SFG-4D	SFILLDUP01	SFG-3S	SFG-3D	SFG-2S	SFG-2D	SFG-1S	SFG-1D
Laboratory Sample Number			HA6455	HA6457	HA6461	HA6463	HA6464	HA6465	HA6466	HA6470	HA6476	HA6477
Sampling Date	Quant	Quant	10/22/91	10/22/91	10/22/91	10/23/91	10/23/91	10/23/91	10/23/91	10/23/91	10/23/91	10/23/91
Dilution Factor	Limit	Limit	1.2	1.5	1.3	1.2	1.2	1.3	1.2	1.3	6.3	1.3
Units	ug/L	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
PP BASE/NEUTRAL EXTRACTABLE COMPOUNDS												
Acenaphthene	220	220	843	754	U	435 J	672	1130	809	706	1120 J	1020
Acenaphthylene	410	410	U	U	U	618 J	U	U	U	U	U	U
Anthracene	220	220	2550	1200	U	662 J	909	1930	1170	1080	2590	1780
Benzo(a)anthracene	910	910	3660	1820	U	458 J	1910	3330	1270	1680	4200J	2680
Benzo(a)pyrene	290	290	3120	1560	U	428 J	1680	2740	1010	1460	3690	2370 J
Benzo(b)fluoranthene	560	560	2800	1550	150J	651 J	1860	3210	1200	1490	3010	2150 J
Benzo(g,h,i)perylene	480	480	2070	990	U	UJ	1440	2150	821	1050	U	1450 J
Benzo(k)fluoranthene	290	290	U	U	U	UJ	U	U	U	U	U	UJ
bis(2-Chloroethoxy)methane	620	620	U	U	U	UJ	U	U	U	U	U	U
Bis(2-chloroethyl) ether	660	660	U	U	U	UJ	U	U	U	U	U	U
bis(2-chloroisopropyl) ether	660	660	U	U	U	UJ	U	U	U	U	U	U
bis(2-Ethylhexyl)phthalate	1200	1200	4328 JB	396 JB	4905 B	8935 JB	810 JB	694 JB	375 BJ	512 JB	U	605 JB
4-Bromophenylphenyl ether	220	220	U	U	U	UJ	U	U	U	U	U	U
Butylbenzylphthalate	1200	1200	U	U	U	UJ	U	U	U	U	U	U
2-Chloronaphthalene	220	220	U	U	U	UJ	U	U	U	U	U	U
4-Chlorophenylphenyl ether	490	490	U	U	U	UJ	U	U	U	U	U	U
Chrysene	290	290	3980	1940	U	584 J	2120	3820	1640	1850	4510	2970
Dibenz(a,h)anthracene	290	290	U	U	U	UJ	U	U	U	U	U	UJ
1,2-Dichlorobenzene	220	220	U	U	U	430 J	U	U	U	U	U	U
1,3-Dichlorobenzene	220	220	U	U	U	UJ	U	U	U	U	U	U
1,4-Dichlorobenzene	510	510	U	U	U	UJ	U	U	U	U	U	U
3,3'-Dichlorobenzidine	1920	1920	U	U	U	UJ	U	U	U	U	U	U
Diethylphthalate	1200	1200	U	U	U	UJ	U	U	U	U	U	U
Dimethylphthalate	1200	1200	U	U	U	UJ	U	U	U	U	U	U
Di-n-butylphthalate	1200	1200	2480 B	16100 B	10200 B	2400 JB	9620 B	3540 B	30100 B	3180 B	2200 BJ	2960 B
2,4-Dinitrotoluene	660	660	U	U	U	UJ	U	U	U	U	U	U
2,6-Dinitrotoluene	220	220	U	U	U	UJ	U	U	U	U	U	U
Di-n-octylphthalate	1200	1200	U	U	U	UJ	U	U	U	U	U	UJ
Fluoranthene	260	260	8750	4680	310	1100 J	4430	8760	3620	3950	9550	6060
Fluorene	220	220	1270	1200	U	1180 J	653	1760	960	905	2230	1680
Hexachlorobenzene	220	220	U	U	U	UJ	U	U	U	U	U	U
Hexachlorobutadiene	100	100	U	U	U	UJ	U	U	U	U	U	U
Hexachlorocyclopentadiene	1200	1200	U	U	U	UJ	U	U	U	U	U	U
Hexachloroethane	190	190	U	U	U	UJ	U	U	U	U	U	U
Indeno(1,2,3-cd)pyrene	430	430	2100	1060	U	UJ	1460	2250	766	1060	U	1530 J
Isophorone	260	260	U	U	U	UJ	U	U	U	U	U	U
Naphthalene	190	190	836	1980	175 J	4480 J	338	3590	1400	1160	5150	3990
Nitrobenzene	220	220	U	U	U	UJ	U	U	U	U	U	U
N-Nitroso-dimethylamine	1200	1200	U	U	U	UJ	U	U	U	U	U	U
N-Nitroso-di-n-propylamine	1200	1200	U	U	U	UJ	U	U	U	U	U	U
N-Nitroso-diphenylamine	220	220	U	U	U	UJ	U	U	U	284	U	U
Phenanthrene	630	630	7550	5650	BMDL	3120 J	4270	9770	6100	4600	13000	8570
Pyrene	220	220	7280	4190	292	1330 J	4020	6620	4070	3710	7790	5270
1,2,4-Trichlorobenzene	220	220	U	U	U	UJ	U	U	U	U	U	U

continued next page (see last page of table for notes)

TABLE 2 (Continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CEMICAL WASTE MANAGEMENT  
CHICAGO INCINERATOR FACILITY

Dames and Moore Sample Number Laboratory Sample Number Sampling Date Dilution Factor Units	Quant Limit ug/L	Quant Limit ug/Kg	SFG-7S HA6478 10/23/91 1.2 ug/Kg	SFG-7D HA6479 10/23/91 1.3 ug/Kg	SFG-6S HA6481 10/23/91 1.2 ug/Kg	SFG-8D HA6482 10/23/91 1.3 ug/Kg	SFG-6S HA6485 10/24/93 1.3 ug/Kg	SFG-9D HA6486 10/24/93 5.9 ug/Kg	SFG-17S HA6487 10/24/93 1.1 ug/Kg	SFG-17D HA6488 10/24/93 1.3 ug/Kg	FB-102491 HA6506 10/24/93 1.0 ug/Kg
PP BASE/NEUTRAL EXTRACTABLE COMPOUNDS											
Acenaphthene	220	220	2850 J	510	1180	ND	299	BMDL	1570	331	U
Acenaphthylene	410	410	3680 J	U	U	U	U	U	U	U	U
Anthracene	220	220	4000 J	1130	3360	318	1520	1150	3210	525	U
Benzo(a)anthracene	910	910	1710 J	1780	1540	378 J	2770	1900 J	6720	888 J	U
Benzo(a)pyrene	290	290	1350 J	1730 J	977	289 J	2670 J	1610	5600	745	U
Benzo(b)fluoranthene	560	560	1070 J	1630 J	1250	257 J	2290 J	1500 J	5590	878	U
Benzo(g,h,i)perylene	480	480	1080 J	1110 J	683	ND	1900 J	U	4660	563	U
Benzo(k)fluoranthene	290	290	U	U	U	U	U	U	U	U	U
bis(2-Chloroethoxy)methane	620	620	U	U	U	U	U	U	U	U	U
Bis(2-chloroethyl) ether	660	660	U	U	U	U	U	U	U	U	U
bis(2-chloroisopropyl) ether	660	660	U	U	U	U	U	U	U	U	U
bis(2-Ethylhexyl)phthalate	1200	1200	2560 JB	457 JB	U	343 JB	694 JB	U	382 JB	240 JB	U
4-Bromophenylphenyl ether	220	220	U	U	U	U	U	U	U	U	U
Butylbenzylphthalate	1200	1200	U	U	U	U	U	U	U	U	U
2-Chloronaphthalene	220	220	U	U	U	U	U	U	U	U	U
4-Chlorophenylphenyl ether	490	490	U	U	U	U	U	U	U	U	U
Chrysene	290	290	2010 J	2050	2700	473	2940	1950	7570	981	U
Dibenz(a,h)anthracene	290	290	U	U	U	U	U	U	U	U	U
1,2-Dichlorobenzene	220	220	161 J	U	U	U	349	U	U	U	U
1,3-Dichlorobenzene	220	220	U	U	U	U	U	U	U	U	U
1,4-Dichlorobenzene	510	510	U	U	U	U	U	U	U	U	U
3,3'-Dichlorobenzidine	1920	1920	U	U	U	U	U	U	U	U	U
Diethylphthalate	1200	1200	U	U	U	U	U	U	U	U	U
Dimethylphthalate	1200	1200	U	U	U	U	U	U	U	U	U
Di-n-butylphthalate	1200	1200	1430 JB	1830 B	3210 B	2208 B	9900 B	1800 JB	3690 B	8700 B	U
2,4-Dinitrotoluene	660	660	U	U	U	U	U	U	U	U	U
2,6-Dinitrotoluene	220	220	U	U	U	U	U	U	U	U	U
Di-n-octylphthalate	1200	1200	U	U	U	U	U	U	U	U	U
Fluoranthene	260	260	4720 J	3890	4550	954	5590	4500	14200	2370	U
Fluorene	220	220	6800 J	813	1290	206 J	394	1390	2450	463	U
Hexachlorobenzene	220	220	U	U	U	U	U	U	U	U	U
Hexachlorobutadiene	100	100	U	U	U	U	U	U	U	U	U
Hexachlorocyclopentadiene	1200	1200	U	U	U	U	U	U	U	U	U
Hexachloroethane	190	190	U	U	U	U	U	U	U	U	U
Indeno(1,2,3-cd)pyrene	430	430	1080 J	1060 J	651	U	1760 J	U	4810	548	U
Isophorone	260	260	U	U	U	U	U	U	U	U	U
Naphthalene	190	190	12600 J	2090	2360	214	3610	2320	2300	496	U
Nitrobenzene	220	220	U	U	U	U	865	U	U	U	U
N-Nitroso-dimethylamine	1200	1200	U	U	U	U	U	U	U	U	U
N-Nitroso-di-n-propylamine	1200	1200	U	U	U	U	U	U	U	U	U
N-Nitroso-diphenylamine	220	220	U	U	U	U	U	U	U	U	U
Phenanthrene	630	630	14900 J	4300	8600	1100	7280	6160	12300	2640	U
Pyrene	220	220	6230 J	3180	6670	932	5350	3860	12600	2100	U
1,2,4-Trichlorobenzene	220	220	U	U	U	U	U	U	U	U	U

continued next page (see last page of table for notes)

TABLE 2 (Continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CEMICAL WASTE MANAGEMENT  
CHICAGO INCINERATOR FACILITY

Dames and Moore Sample Number	Quant	Quant	SFG-4S	SFG-10D	SFG-4D	SFILLDUP01	SFG-3S	SFG-3D	SFG-2S	SFG-2D	SFG-1S	SFG-1D
Laboratory Sample Number	Limit	Limit	HA6455	HA6457	HA6461	HA6463	HA6464	HA6465	HA6466	HA6470	HA6476	HA6477
Sampling Date	ug/L	ug/Kg	10/22/91	10/22/91	10/22/91	10/23/91	10/23/91	10/23/91	10/23/91	10/23/91	10/23/91	10/23/91
Units	ug/L	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
INORGANIC PARAMETERS												
Antimony	60	6000	U	U	U	UJ	7600	U	U	9400	U	U
Arsenic	10	1000	9600	11000	5600	380000 J	48000	24000	76000	46000	7600	7900
Beryllium	1.0	100	760	680	870	810 J	640	1000	760	690	700	1100
Cadmium	3.0	200	2500	1800	2300	2900 J	3100	3100	2800	2800	1800	2900
Chromium	10	1000	20000	15000	21000	23000 J	14000	27000	35000	16000	18000	19000
Copper	10	1000	40000	34000	26000	52000 J	55000	41000	38000	44000	27000	29000
Lead	5.0	500	76000	310000	19000	150000 J	150000	100000	75000	180000	69000	90000
Mercury	0.02	80	110	350	U	240 J	3800	560	3100	1100	110	190
Nickel	10	1000	28000	14000	30000	33000 J	23000	27000	32000	18000	18000	17000
Selenium	5.0	500	BMDL J	BMDL J	BMDL J	BMDL J	BMDL	BMDL J	BMDL J	BMDL J	BMDL J	BMDL J
Silver	10	1000	BMDL	BMDL J	BMDL J	BMDL J	BMDL	BMDL J	BMDL J	BMDL J	BMDL J	BMDL J
Thallium	10	1000	BMDL J	UJ	BMDL J	BMDL J	BMDL J	BMDL J	BMDL J	BMDL J	BMDL J	BMDL J
Zinc	20	2000	120000	160000	65000	150000 J	98000	130000	120000	190000	98000	266000

continued next page (see last page of table for notes)

TABLE 2 (Continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CEMICAL WASTE MANAGEMENT  
CHICAGO INCINERATOR FACILITY

Dames and Moore Sample Number Laboratory Sample Number Sampling Date Units	Quant Limit ug/L	Quant Limit ug/Kg	SFG-7S HA6478 10/23/91 ug/Kg	SFG-7D HA6479 10/23/91 ug/Kg	SFG-8S HA6481 10/23/91 ug/Kg	SFG-8D HA6482 10/23/91 ug/Kg	SFG-9S HA6485 10/24/91 ug/Kg	SFG-9D HA6486 10/24/91 ug/Kg	SFG-17S HA6487 10/24/91 ug/Kg	SFG-17D HA6488 10/24/91 ug/Kg	FB-102491 HA6506 10/24/91 ug/Kg	FG-10GW HA6528 10/22/91 ug/L
INORGANIC PARAMETERS												
Antimony	60	6000	UJ	U	U	UJ	U	U	U	UJ	U	BMDL
Arsenic	10	1000	29000 J	16000	193000	33000 J	4800	6500	4800	8500 J	U	BMDL
Barium	20	2000	NA	NA	NA	NA	NA	NA	NA	NA	NA	270
Beryllium	1.0	100	2500 J	620	990	560	2000	630	620	700	U	BMDL
Cadmium	3.0	200	5000 J	2400	2800	2000	2400	1600	1900	1800	U	U
Chromium	10	1000	453000 J	13000	45000	14000 J	41000	14000	18000	18000 J	U	BMDL
Cobalt	20	2000	NA	NA	NA	NA	NA	NA	NA	NA	NA	U
Copper	10	1000	110000 J	71000	90000	R	53000	20000	136000	31000	U	BMDL
Lead	5.0	500	390000 J	110000	110000	190000 J	48000	91000	530000	39000	U	BMDL
Mercury	0.02	80	590 J	190	190	240	220	220	U	U	BMDL	U
Nickel	10	1000	47000 J	20000	34000	15000	32000	11000	15000	31000 J	U	110
Selenium	5.0	500	8200	BMDL J	BMDL	BMDL	BMDL J	BMDL J	BMDL J	BMDL J	UJ	BMDL J
Silver	10	1000	1300 J	BMDL J	BMDL J	ND	BMDL	BMDL	BMDL	BMDL	U	BMDL
Thallium	10	1000	UJ	BMDL J	3200 J	ND	BMDL J	BMDL	BMDL J	BMDL J	UJ	UJ
Tin	50	5000	NA	NA	NA	NA	NA	NA	NA	NA	NA	160
Vanadium	20	2000	NA	NA	NA	NA	NA	NA	NA	NA	NA	U
Zinc	20	2000	1410000 J	160000	160000	210000 J	74000	87000	277000	59000 J	21	BMDL

LEGEND:

- U Compound was not detected at laboratory method detection limit.
  - J Estimated value due to limitations identified during the quality assurance review.
  - UJ Reported method detection limit is estimated due to limitations identified during the quality assurance review.
  - B Compound was detected in a laboratory and/or field blank at similar concentrations. May represent laboratory and/or field contamination.
  - R Unreliable result. Compound may or may not be present.
  - \* Sample results reported from dilution analysis
  - BMDL Below Method Detection Limit Reported by laboratory.
  - No standard available. Compound was qualitatively searched for.
  - IND Indeterminate. Standard and/or spikes could not be detected at method detection limit.
- Discrepancies may exist between the laboratory data tables and the data validation summary tables due to variations in the rounding of calculations.





**DATA VALIDATION/QUALITY ASSURANCE REVIEW  
PHASE II RCRA FACILITY INVESTIGATION  
CHEM WASTE MANAGEMENT, INC. - CHICAGO INCINERATOR  
SAMPLE COLLECTION DATE: OCTOBER 28 - OCTOBER 29, 1991  
DAMES & MOORE JOB NO.: 13963-055-192**

**LABORATORY REPORT Nos.: 101401, 101403 & 101405**

**INTRODUCTION**

Eleven (11) soil samples, plus one (1) field-duplicate sample, one (1) groundwater sample, one (1) field-blank sample and three (3) trip-blank sample were collected and submitted to Environmental Testing Corporation (ETC) of Edison, New Jersey (1992 Illinois Certification No. 100224). All samples included in this review are listed on Table 1. All soil samples and the associated field-blank sample were analyzed for priority pollutant volatile organic compounds, semivolatile organic compounds (base/neutral and acid-extractable organic compounds) and metals. The associated trip-blank samples were analyzed for priority pollutant volatile organic compounds only. The groundwater sample was analyzed for RCRA Appendix IX heated purge and trap (HP/T) volatile organic compounds, purge and trap (P/T) volatile organic compounds, semivolatile organic compounds and metals. The associated trip-blank sample was analyzed for RCRA Appendix IX HP/T and P/T volatile organic compounds only. All samples were analyzed following USEPA SW-846 Methodologies.

A data validation review was performed on all samples prepared under a modified CLP-SOW 3/90 CLP-I data deliverable format. Data were examined to assess the usability of the results, as well as to assess compliance relative to data package deliverable requirements. The organic data review is based upon a rigorous review of the reported hold times, surrogate recoveries, blank spike recoveries, matrix spike and matrix spike duplicate summaries, blank contaminants, internal standard area performance, Gas Chromatography/Mass Spectroscopy (GC/MS) tuning and calibration data.

The inorganic data review is based on a review of the reported hold times, blank analysis results, blank spike recoveries, matrix spike and duplicate results, calibration results, post-digestion spike recoveries and Inductively Coupled Plasma (ICP) serial dilution analysis.

Details of the data validation/quality assurance review are presented in the narrative section of the report. The data is summarized in Table 1 of the report. Data qualifiers have been placed next to the results so that the data user can quickly assess the qualitative and/or quantitative reliability of the reported result. This report was prepared to provide a critical review of the laboratory analysis and reported chemical results. Quality assurance reviews of laboratory-generated data routinely

identify problems associated with analytical measurements, even from the most experienced and capable laboratories.

This review has been performed in accordance with the requirements specified in the "Laboratory Data Validation Functional Guidelines for Evaluating Organic Analyses" dated February 1988 and "Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses" dated July 1988.

**TABLE 1**

**SAMPLES INCLUDED IN REVIEW**

<u>Sample ID</u>	<u>Lab ID</u>	<u>Date Collected</u>	<u>Test Requested</u>
<u>Laboratory Report No. 101401</u>			
FG-10S	HA6489	10/28/91	PP VOA, PP BNA & PP Metals
FILLFB102891	HA6505	10/28/91	PP VOA, PP BNA & PP Metals
TB102891	HA6508	10/28/91	PP VOA
<u>Laboratory Report No. 101403</u>			
FG-15D	HA6490	10/29/91	PP VOA, PP BNA & PP Metals
FG-11S	HA6491	10/29/91	PP VOA, PP BNA & PP Metals
FG-11D	HA6492	10/29/91	PP VOA, PP BNA & PP Metals
FG-5S	HA6493	10/29/91	PP VOA, PP BNA & PP Metals
FG-5D	HA6494	10/29/91	PP VOA, PP BNA & PP Metals
FG-6S	HA6642	10/29/91	PP VOA, PP BNA & PP Metals
FG-6D	HA6643	10/29/91	PP VOA, PP BNA & PP Metals
FG-15S	HA6644	10/29/91	PP VOA, PP BNA & PP Metals
FILLDUP02	HA6645	10/29/91	PP VOA, PP BNA & PP Metals
FG-16S	HA6646	10/29/91	PP VOA, PP BNA & PP Metals
FG-16D	HA6647	10/29/91	PP VOA, PP BNA & PP Metals
TB-102991	HA6509	10/29/91	PP VOA
<u>Laboratory Report No. 101405</u>			
FG-9GW	HA6530	10/29/91	RCRA Appendix IX HP/T VOA, P/T VOA, BNA & Metals
TB-103191	HA6587	10/31/91	RCRA Appendix IX HP/T VOA & P/T VOA
<u>Legend:</u>			
PP VOA	=	Priority Pollutant Volatile Organic Compounds	
PP BNA	=	Priority Pollutant Semi-Volatile Organic Compounds (Base/Neutral and Acid-Extractable Organic Compounds)	
PP Metals	=	Priority Pollutant Metals	
HP/T VOA	=	RCRA Appendix IX Heated Purge and Trap Volatile Organic Compounds	
P/T VOA	=	RCRA Appendix IX Purge and Trap Volatile Organic Compounds	
BNA	=	RCRA Appendix IX Semi-Volatile Organic Compounds (Base/Neutral and Acid-Extractable Organic Compounds)	

## GENERAL COMMENTS

With regard to the data package deliverables, most of the requirements were met with the exception of the metals fraction. This reviewer has observed that for the ICP concentrations reported at 10 to 15 times above the method detection limit (MDL), the data validation cannot reproduce the laboratory reported results. The calculation obtained during data validation is consistently higher than the laboratory reported concentration. This is due to the fact that the interelement correction factors in the ICP instrument have been externally calculated in the system. Since this external interelement correction factor is not available for review, the reported results for low level samples cannot be reproduced. It should be noted that positive ICP reported results that are significantly above than the MDL (approximately 100 times higher or more) were reproduced and validated, since this interelement correction factor becomes negligible at higher concentrations. The data review assumes that the low level reported concentrations (10 to 15 times the MDL) are correct as reported and it is this reviewer's opinion that data usability is not impacted.

## DATA QUALIFIERS

Overall, the data quality is good. The data validation review has identified aspects of the analytical data that require qualification. To confidently use any of the data within the data set, the data user should understand the limitations and qualifications presented. With regard to data usability, the following qualifiers are offered based upon the data provided.

### ORGANIC QUALIFIERS

#### Hold Times:

- All samples were analyzed and/or extracted within the required hold time for all organic parameters.

#### Blank Contamination:

- Due to the presence of di-n-butyl phthalate and bis(2-ethylhexyl)phthalate in the semivolatile method blank, positive results in all samples are qualitatively questionable and have been flagged (B) on the summary table.

#### Surrogate Recoveries:

- The acid-extractable surrogate, 2-fluorophenol, was recovered outside the control limits (low) for the soil sample FG-16D. No qualifier has been applied since only one surrogate per sample is outside the control limits.
- The semivolatile surrogates, terphenyl-d14 and 2-fluorophenol, were recovered outside the control limits (high) for the groundwater sample FG-9GW. The positive results for this sample may be biased high and have been flagged (J) estimated on the summary tables. There is no impact on the non-detected results and no qualifier has been applied.

#### Internal Standards:

- The area counts of the semivolatile internal standards, chrysene-d12 and perylene-d12, were outside the control limits (low) for the groundwater sample FG-9GW. The positive and non-detected compounds quantitated against these internal standards are regarded as estimated values and have been flagged (J/UJ) estimated on the summary tables.

#### Matrix Spike and Matrix Spike Duplicate Summary (MS/MSD):

- Sample FILLDUP02 was collected and submitted to the laboratory as a blind field duplicate of sample FG-15S. The reproducibility of the semivolatile organic results are good providing a positive indication of the field and laboratory precision associated with these analyses.
- For the volatile organic results, however, the duplicate sample (FILLDUP02 and FG-15S) reproducibility are poor. For the most part, the concentrations of the positive results in sample FG-15S are 10 times higher than the concentration of the positive results in sample FILLDUP02. The positive volatile results for both field duplicates are regarded as estimated values and have been flagged (J) estimated on the summary tables. There is no impact on the non-detected results and no qualifier has been applied.
- All heated purge and trap volatile (HP/T VOA) blank spike recoveries associated with samples FG-9GW and TB-103191 were outside the control limits (low). The positive and non-detected HP/T VOA results for both samples may be biased low and have been flagged (J/UJ) estimated.
- The purge and trap volatile (P/T VOA) spiking compounds, trichloroethene (TCE) and toluene, were recovered outside the control limits

(high) for samples FILLDUP02MS/MSD and may be biased high. The positive toluene results in the field duplicate samples FILLDUP02 and FG-15S may be biased high and have been flagged (J) estimated. Since TCE was non-detected for both field samples, there is no impact on the data quality and no qualifier has been applied.

- The blank spike recoveries associated with the soil semivolatile compounds 2-chlorophenol, 2,4-dichlorophenol, 2,4-dimethylphenol, 2-nitrophenol, phenol, bis(2-chloroethoxy)methane, bis(2-chloroisopropyl)-ether, 1,2-dichlorobenzene, 1,3-dichlorobenzene, 1,4-dichlorobenzene, hexachlorobutadiene, hexachloroethane, isophorone, naphthalene, nitrobenzene, n-nitroso-di-n-propylamine and 1,2,4-trichlorobenzene, were outside the control limits (low). The positive and non-detected results of these compounds in all soil samples may be biased low and have been flagged (J/UJ) estimated on the summary tables.
- The semivolatile spiking compound, 1,2,4-trichlorobenzene for the groundwater samples FG-9GWMS/MSD was recovered outside the control limits (high) and may be biased high. No qualifier has been applied since this compound was non-detected in the unspiked sample.
- The semivolatile blank spike recoveries of diethylphthalate, dimethylphthalate and phenol, associated with the groundwater sample FG-9GW, were outside the control limits (low). The positive and non-detected results of these compounds in the groundwater sample may be biased low and have been flagged (J/UJ) estimated.
- The semivolatile blank spike recoveries of dimethyl phthalate, associated with samples FG-9GW and FILLFB102891 and diethylphthalate, associated with sample FILLFB102891 only, were less than 10%. The non-detected results of these compounds are unreliable and have been flagged (R) on the summary tables.
- The semivolatile blank spike recoveries of 2-nitrophenol, phenol, butyl benzyl phthalate, 3,3'-dichlorobenzidine, associated with the field blank sample, FILLFB102891, were outside the control limits (low). The non-detected results of these compounds may be biased low and have been flagged (UJ) estimated.

#### Initial and Continuing Calibrations:

- Sample FG-9GW was analyzed at a 1:250 dilution for HP/T VOAs, and at a 1:1000 dilution for the P/T VOAs resulting in elevated detection limits due to target compound concentrations exceeding the initial linear calibration range requirements.
- The soil samples FG-15D, FG-5S, FG-5D and the groundwater sample FG-9GW were re-analyzed at elevated dilutions for volatiles due to target compound concentrations exceeding the linear calibration range requirements.
- Due to the high percent difference between the initial and continuing calibration response factors of all HP/T VOA compounds associated with samples FG-9GW and TB-103191. The positive and non-detected results are regarded as estimated values and have been flagged (J/UJ) on the summary tables.
- The response factors of the volatile compound, methyl ethyl ketone (MEK) for samples FG-9GW and TB-103191 and the semivolatile compound, hexachlorophene for sample FG-9GW only, were less than 0.05 for the initial and continuing calibrations. Due to the low response factors, the non-detected results of these compounds for the samples are unreliable and have been flagged (R) on the summary tables.

#### Additional Comments:

- As per the requirements, all values calculated below the method detection limit should be considered estimated and have been flagged (J) on the data table.

#### INORGANICS PARAMETER QUALIFIERS

##### Hold Times:

- All samples were digested and analyzed within the required hold time criteria for the metals analyses.

##### Blank Contamination:

- Trace presence of mercury has been identified in the soil field-blank sample, FILLFB-102891 at below the method detection limit (BMDL). The positive mercury results in the soil samples reported as BMDL are

qualitatively questionable and have been flagged (B) on Table 2. The positive mercury results reported above the method detection limits are regarded as "real" values and no qualifier has been applied.

#### Instrument Calibration and Verification:

- The initial and continuing calibration verification recoveries of all metals were reported within control limits.

#### ICP Serial Dilution:

- The ICP serial dilution analyses of chromium, copper and zinc for the soil sample FG-15D were outside the control limits. The positive results of these analytes for the sample have been flagged (J) estimated on the summary tables.

#### Matrix Spike and Duplicate Summary:

- Sample FILLDUP02 was collected and submitted to the laboratory as a blind field duplicate of sample FG-15S. The reproducibility of the metal analytes are good, providing a positive indication of the precision associated with the field and laboratory procedures.
- The matrix spike recoveries of cadmium, chromium, copper, nickel, lead and zinc for the soil sample FG-15DMS were outside the control limits (high). The positive results of these analytes in the unspiked sample may be biased high and have been flagged (J) estimated.
- Due to the low spike recoveries of antimony, arsenic and selenium in the soil sample FG-15DMS, the positive and non-detected results of these analytes in the unspiked sample may be biased low and have been flagged (J/UJ) estimated.
- Due to the high relative percent differences (RPD) associated with the duplicate analyses of antimony and nickel in the soil sample FG-15DMS, the positive results of these analytes have been flagged (J) estimated.
- A low matrix spike recovery was obtained for the analytes selenium and mercury for the groundwater sample FG-9GWMS. The positive and non-detected results of these analytes in the unspiked sample may be biased low and have been flagged (J/UJ) estimated on the summary tables.
- Due to the high relative percent differences (RPD) associated with the duplicate analyses of beryllium, copper, nickel, lead and zinc in the



groundwater sample FG-9GWMS, the positive results of these analytes have been flagged (J) estimated.

**Post-Digestion Spike Recoveries:**

- The post-spike recoveries of the following analytes were recovered outside the control limits (low). Positive and/or non-detected results of these analytes for the associated samples may be biased low and have been flagged (J) estimated.

<u>Analyte</u>	<u>Log Link</u>	<u>Associated Sample</u>
Selenium	101403	FG-11S, FG-15S, FILLDUP02, FG-16S, FG-16D, FG-16D, FG-6S & FG-6D
	101405	FG-9GW
Thallium	101401	FG-10S
	101403	FG-15D, FG-15S, FG-16S & FG-16D

- The post-spike recovery of arsenic for the soil sample FG-10S was recovered outside the control limits (high) and may be biased high. The positive result of this analyte in the sample may be biased high and has been flagged (J) estimated on the summary tables.

**Additional Comments:**

- The laboratory reports several inorganic results as below the method detection limit (BMDL). These are reported as BMDL on Table 2. The actual concentrations are not calculated during the data validation review since the interelement coefficient factors were not provided.

TABLE 2  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number			FW-9GW	TB-103191
Sample Depth (ft)			9-10'	NA
Laboratory Sample Number			HA6530	HA6587
Sampling Date	Quant	Quant	10/29/91	10/31/91
Dilution Factor	Limit	Limit	250	1.0
Units	ug/L	ug/Kg	ug/L	ug/L
APPENDIX IX HEATED P/T VOLATILE COMPOUNDS				
Acetonitrile	15	15	14800 J	UJ
Acrolein	20	20	UJ	UJ
Acrylonitrile	10	10	UJ	UJ
1,4-Dioxane	300	300	UJ	UJ
Ethyl cyanide	40	40	UJ	UJ
Isobutyl alcohol	230	230	UJ	UJ
Methacrylonitrile	110	110	UJ	UJ

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO INCINERATOR FACILITY

Dames and Moore Sample Number			FW-9GW	TB-103191
Sample Depth (ft)			9-10'	NA
Laboratory Sample Number			HA6530	HA6587
Sampling Date	Quant	Quant	10/29/91	10/31/91
Dilution Factor	Limit	Limit	1000	1.0
Units	ug/L	ug/Kg	ug/L	ug/L
APPENDIX IX P/T VOLATILE COMPOUNDS				
Benzene	4.4	4.4	U	U
Methyl bromide	10	10	U	U
Carbon disulfide	10	10	U	U
Chloroethane	10	10	U	U
Chlorobenzene	6.0	6.0	U	U
2-Chloro-1,3-butadiene	-	-	U	U
Chloroform	1.6	1.6	U	U
Methyl chloride	10	10	U	U
3-Chloropropene	10	10	U	U
1,2-Dibromo-3-chloropropane	10	10	U	U
1,2-Dibromoethane	10	10	U	U
Dibromomethane	10	10	U	U
1,4-Dichloro-2-butene	10	10	U	U
Dichlorodifluoromethane	10	10	U	U
1,1-Dichloroethane	4.7	4.7	U	U
1,2-Dichloroethane	2.8	2.8	U	U
1,2-Dichloroethene (trans)	1.6	1.6	U	U
1,1-Dichloroethene	2.8	2.8	46900	U
Methylene Chloride	2.8	2.8	199000	U
1,2-Dichloropropane	6.0	6.0	U	U
cis-1,3-Dichloropropene	5.0	5.0	U	U
trans-1,3-Dichloropropene	10	10	U	U
Chlorodibromomethane	3.1	3.1	U	U
Dichlorobromomethane	2.2	2.2	U	U
Ethyl methacrylate	10	10	U	U
Iodomethane	10	10	U	U
Methyl ethyl ketone	10	10	R	R
Methyl methacrylate	10	10	U	U
Pentachloroethane	-	-	U	U
1,1,1,2-Tetrachloroethane	10	10	U	U
1,1,2,2-Tetrachloroethane	4.1	4.1	U	U
Tetrachloroethene	4.1	4.1	U	U
Carbon Tetrachloride	2.8	2.8	U	U
Toluene	6.0	6.0	U	U
Bromoform	4.7	4.7	U	U
1,1,1-Trichloroethane	3.8	3.8	U	U
1,1,2-Trichloroethane	5.0	5.0	134000	U

continued on next page (see last page for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO INCINERATOR FACILITY

Dames and Moore Sample Number			FW-9GW	TB-103191
Sample Depth (ft)			9-10'	NA
Laboratory Sample Number			HA6530	HA6587
Sampling Date	Quant	Quant	10/29/91	10/31/91
Dilution Factor	Limit	Limit	1000	1.0
Units	ug/L	ug/Kg	ug/L	ug/L
APPENDIX IX P/T VOLATILE COMPOUNDS (continued)				
Trichloroethene	1.9	1.9	1190 J	3.11
Trichlorofluoromethane	10	10	U	U
1,2,3-Trichloropropane	10	10	U	U
Vinyl Chloride	10	10	7660 J	21.7
Acetone	10	10	U	49.9
Ethylbenzene	7.2	7.2	U	U
2-Hexanone	10	10	U	U
Methyl isobutyl ketone	10	10	U	7.5
Styrene	10	10	U	U
Vinyl acetate	10	10	U	U
m-Xylene	10	10	U	1.6
o,p-Xylenes	10	10	U	U

continued on next page (see last page for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number			FW-9GW	TB-103191
Sample Depth (ft)			9-10'	NA
Laboratory Sample Number			HA6530	HA6587
Sampling Date	Quant	Quant	10/29/91	10/31/91
Dilution Factor	Limit	Limit	20	1.0
Units	ug/L	ug/Kg	ug/L	ug/L
APPENDIX IX SEMIVOLATILE COMPOUNDS				
Acetophenone	17	1000	U	NA
2-Acetylaminofluorene	17	1000	U	NA
4-Aminobiopheny	17	1000	U	NA
Aniline	17	1000	5130 J	NA
Aramite	17	1000	UJ	NA
Benzo(a)anthracene	13	790	UJ	NA
Benzo(b)fluoranthene	8.0	490	UJ	NA
Benzo(a)pyrene	4.2	250	UJ	NA
Bis(2-Chloroethoxy)methane	8.8	540	U	NA
Bis(2-chloroethyl) ether	9.5	580	U	NA
Bis(2-chloroisopropyl) ether	9.5	580	U	NA
Bis(2-Ethylhexyl)phthalate	17	1000	UJ	NA
4-Bromophenylphenyl ether	3.2	190	U	NA
Butylbenzylphthalate	17	1000	UJ	NA
2-sec-Butyl-4,6-dinitrophen	17	1000	U	NA
p-Chloroaniline	17	1000	13900 J	NA
p-Chloro-m-cresol	5.0	300	U	NA
2-Chloranaphthalene	3.2	190	U	NA
2-Chlorophenol	5.5	330	U	NA
Chrysene	4.2	250	UJ	NA
Acenaphthene	3.2	190	U	NA
Acenaphthylene	5.8	350	U	NA
Anthracene	3.2	190	U	NA
Benzo(ghi)perylene	6.8	415	UJ	NA
Benzo(k)fluoranthene	4.2	250	UJ	NA
Fluorene	3.2	190	U	NA
Phenanthrene	9.0	550	U	NA
Pyrene	3.2	190	UJ	NA
2-Nitrophenol	6.0	365	U	NA
o-Cresol	17	1000	U	NA
m+p-Cresols	17	1000	1160 J	NA
Diallate	17	1000	U	NA
Dibenzo(a,h)anthracene	4.2	250	UJ	NA
Di-N-butyl phthalate	17	1000	U	NA
1,2-Dichlorobenzene	3.2	190	U	NA
1,3-Dichlorobenzene	3.2	190	U	NA
1,4-Dichlorobenzene	7.3	450	U	NA
3,3-Dichlorobenzidine	27.5	1675	UJ	NA
2,4-Dichlorophenol	4.5	275	8820 J	NA
2,6-Dichlorophenol	17	1000	1460 J	NA

continued next page (see last page of table for notes)

TABLE 2  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number			FW-9GW	TB-103191
Sample Depth (ft)			9-10'	NA
Laboratory Sample Number			HA6530	HA6587
Sampling Date			10/29/91	10/31/91
Dilution Factor	Quant Limit	Quant Limit	20	1.0
Units	ug/L	ug/Kg	ug/L	ug/L
APPENDIX IX SEMIVOLATILE COMPOUNDS (continued)				
Diethylphthalate	17	1000	UJ	NA
p-Dimethylaminoazobenzene	17	1000	UJ	NA
7,12-Dimethylbenzo(a)anthra	17	1000	UJ	NA
3,3-Dimethylbenzidine	17	1000	UJ	NA
a-a-Dimethylphenethylamine	-	-	-	NA
2,4-Dimethylphenol	4.5	275	U	NA
Dimethyl phthalate	17	1000	R	NA
m-Dinitrobenzene	17	1000	U	NA
4,6-Dinitro-0-cresol	40	2400	U	NA
2,4-Dinitrophenol	70	4250	U	NA
2,4-Dinitrotoluene	9.5	580	U	NA
2,6-Dinitrotoluene	3.2	190	U	NA
Di-n-octyl phthalate	17	1000	UJ	NA
Diphenylamine	17	1000	U	NA
N-nitrosodipropylamine	17	1000	U	NA
Ethyl methanesulfonate	17	1000	U	NA
Fluoranthene	3.7	225	U	NA
Hexachlorobenzene	3.2	190	U	NA
Hexachlorobutadiene	1.5	90	U	NA
Hexachlorocyclopentadiene	17	1000	U	NA
Hexachloroethane	2.7	165	U	NA
Isodrin	9.6	1000	U	NA
Hexachlorophene	17	1000	R	NA
Hexachloropropene	17	1000	U	NA
Indeno(1,2,3-c,d)pyrene	6.2	365	UJ	NA
Isosafrole	17	600	U	NA
Methapyrilene	-	-	IND	NA
3-Methylcholanthrene	9.2	555	UJ	NA
Methyl methanesulfonate	17	1000	U	NA
Naphthalene	2.7	165	U	NA
1,4-Naphthoquinone	17	1000	U	NA
1-Naphthylamine	17	1000	U	NA
2-Naphthylamine	17	1000	U	NA
p-Nitroaniline	17	1000	U	NA
Nitrobenzene	3.2	190	1000 J	NA
4-Nitrophenol	4.0	240	U	NA
4-Nitroquinoline-N-oxide	-	-	IND	NA
N-Nitrosodiphenylamine	3.2	190	U	NA
N-Nitrosodi-n-butylamine	17	1000	U	NA
N-Nitrosodiethylamine	17	1000	U	NA
N-Nitrosodimethylamine	17	1000	U	NA
N-Nitrosomethylethylamine	17	1000	U	NA

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number			FW-9GW 9-10'	TB-103191
Sample Depth (ft)			HA6530	HA6587
Laboratory Sample Number			10/29/91	10/31/91
Sampling Date	Quant	Quant	20	1.0
Dilution Factor	Limit	Limit	ug/L	ug/L
Units	ug/L	ug/Kg		
APPENDIX IX SEMIVOLATILE COMPOUNDS (continued)				
N-Nitrosomorpholine	17	1000	U	NA
N-Nitrosopiperidine	17	1000	U	NA
N-Nitrosopyrrolodine	17	1000	U	NA
5-Nitro-o-toluidine	17	1000	U	NA
Pentachlorobenzene	17	1000	U	NA
Pentachloronitrobenzene	17	1000	U	NA
Pentachlorophenol	6.0	365	U	NA
Phenacetin	17	1000	U	NA
Phenol	2.5	150	10100 J	NA
m-phenylenediamine	17	1000	U	NA
o-phenylenediamine	17	1000	U	NA
p-phenylenediamine	17	1000	U	NA
2-Picoline	17	1000	U	NA
Pronamide	17	1000	U	NA
Pyridine	17	1000	8450 J	NA
Safrole	17	1000	U	NA
1,2,4,5-Tetrachlorobenzene	17	1000	U	NA
2,3,4,6-Tetrachlorophenol	17	1000	U	NA
Tetraethyldithiopyrophospha	-	-	U	NA
o-Toluidine	17	1000	U	NA
1,2,4-Trichlorobenzene	3.2	190	U	NA
2,4,5-Trichlorophenol	17	1000	U	NA
2,4,6-Trichlorophenol	4.5	275	79 J	NA
0,0,0-Triethyl phosphorothi	-	-	U	NA
sym-Trinitrobenzene	-	-	IND	NA
Benzyl alcohol	17	1000	U	NA
Dibenzofuran	17	1000	U	NA
Isophorone	3.7	225	U	NA
2-Methylnaphthalene	17	1000	U	NA
o-Nitroaniline	17	1000	U	NA
m-Nitroaniline	17	1000	U	NA
4-Chlorophenyl phenyl ether	7.0	425	U	NA

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number			FG-5S	FG-5D	FG-6S	FG-6D	FG-10S	FG-11S	FG-11D	FG-15S	FILLDUP02	FG-15D
Sample Depth (ft)			6-8'	12-14'	6-8'	13-15'	6-8'	2-6'	14-16'	6-8'	6-8'	18-20'
Laboratory Sample Number			HA6493	HA6494	HA6642	HA6643	HA6489	HA6491	HA6492	HA6644	HA6645	HA6690
Sampling Date			10/29/91	10/29/91	10/29/91	10/29/91	10/28/91	10/29/91	10/29/91	10/29/91	10/29/91	10/29/91
Dilution Factor			70	60	1.4	1.4	1.2	1.2	15	5.7	1.1	614
Units	Quant Limit ug/L	Quant Limit ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
PRIORITY POLLUTANT P/T VOLATILE COMPOUNDS												
Benzene	4.4	4.4	847	589	10.6	8.36	U	U	2280	88.5 J	7.95 J	2550 J
Bromoform	4.7	4.7	U	U	U	U	U	U	U	U	U	U
Carbon Tetrachloride	2.8	2.8	U	U	U	U	U	U	U	U	U	U
Chlorobenzene	6.0	6.0	462	276 J	U	U	U	U	U	24.8 J	5.4 J	7440 J
Chlorodibromomethane	3.1	3.1	U	U	U	U	U	U	U	U	U	U
Chloroethane	10	10	U	U	U	U	U	U	U	U	U	U
2-Chloroethyl vinyl ether	10	10	U	U	U	U	U	U	U	U	U	U
Chloroform	1.6	1.6	U	U	U	U	U	U	U	U	U	U
Dichlorobromomethane	2.2	2.2	U	U	U	U	U	U	U	U	U	U
Dichlorodifluoromethane	10	10	U	U	U	U	U	U	U	U	U	U
1,1-Dichloroethane	4.7	4.7	U	U	U	U	U	U	U	U	U	U
1,2-Dichloroethane	2.8	2.8	U	U	U	U	U	U	235	U	U	42000
1,1-Dichloroethene	2.8	2.8	3370	1560	U	U	4.16	U	U	431 J	32.3 J	U J
1,2-Dichloropropane	6.0	6.0	U	U	U	U	U	U	U	U	U	U
cis-1,3-Dichloropropene	5.0	5.0	U	U	U	U	U	U	U	U	U	U
trans-1,3-Dichloropropene	10	10	U	U	U	U	U	U	U	U	U	U
Ethylbenzene	7.2	7.2	U	U	U	U	U	U	U	U	U	U
Methyl bromide	10	10	U	U	U	U	U	U	U	U	U	U
Methyl chloride	10	10	U	U	U	U	U	U	U	U	U	U
Methylene Chloride	2.8	2.8	1480	U	14.9	13.7	U	U	U	355 J	51.9 J	U J
1,1,2,2-Tetrachloroethane	4.1	4.1	U	U	U	U	U	U	U	U	U	U
Tetrachloroethene	4.1	4.1	U	U	U	U	U	U	U	45.6 J	3.5 J	U J
Toluene	6.0	6.0	1440	1330	U	U	U	U	U	286 J	41.1 J	6250 J
1,2-Dichloroethene (trans)	1.6	1.6	U	U	U	U	U	U	U	U	U	U
1,1,1-Trichloroethane	3.8	3.8	U	U	U	U	U	U	U	U	U	U
1,1,2-Trichloroethane	5.0	5.0	U	U	U	U	U	U	U	U	U	U
Trichloroethene	1.9	1.9	U	U	U	U	U	U	U	U	U	U
Trichlorofluoromethane	10	10	U	U	U	U	U	22.4	U	U	U	U
Vinyl Chloride	10	10	U	U	U	U	U	U	U	U	U	U

continued next page (see last page of table for notes)



TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number			FG-5S	FG-5D	FG-6S	FG-6D	FG-10S	FG-11S	FG-11D	FG-15S	FILLDUP02	FG-15D
Sample Depth (ft)			6-8'	12-14'	6-8'	13-15'	6-8'	2-6'	14-18'	6-8'	6-8'	18-20'
Laboratory Sample Number			HA6493	HA6494	HA6642	HA6643	HA6489	HA6491	HA6492	HA6644	HA6645	HA6690
Sampling Date	Quant	Quant	10/29/91	10/29/91	10/29/91	10/29/91	10/28/91	10/29/91	10/29/91	10/29/91	10/29/91	10/29/91
Dilution Factor	Limit	Limit	12	12	1.4	1.4	1.2	12	1.5	1.1	1.1	12
Units	ug/L	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
ACID EXTRACTABLE COMPOUNDS												
2-Chlorophenol	3.9	340	UJ	UJ	UJ	UJ	UJ	UJ	1060 J	UJ	UJ	UJ
2,4-Dichlorophenol	3.2	280	1900 J	2460 J	71 J	68 J	UJ	UJ	1930 J	124 J	94.5 J	2531 J
2,4-Dimethylphenol	3.2	280	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
4,6-Dinitro-2-methylphenol	29	2400	U	U	U	U	U	U	U	U	U	U
2,4-Dinitrophenol	50	4300	U	U	U	U	U	U	U	U	U	U
2-Nitrophenol	4.3	370	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
4-Nitrophenol	2.9	240	U	U	U	U	U	U	U	U	U	U
4-Chloro-3-methylphenol	3.6	310	U	U	U	U	U	U	U	U	U	U
Pentachlorophenol	4.3	370	U	U	U	U	U	U	U	U	U	U
Phenol	1.8	150	9680 J	12200 J	900 J	504 J	UJ	UJ	963 J	UJ	UJ	2890
2,4,6-Trichlorophenol	3.2	280	U	U	U	U	U	U	194 J	U	U	U

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number			FG-5S	FG-5D	FG-6S	FG-6D	FG-10S	FG-11S	FG-11D	FG-15S	FILLDUP02	FG-15D
Sample Depth (ft)			6-8'	12-14'	6-8'	13-15'	6-8'	2-6'	14-18'	6-8'	6-8'	18-20'
Laboratory Sample Number			HA6493	HA6494	HA6642	HA6643	HA6489	HA6491	HA6492	HA6644	HA6645	HA6690
Sampling Date	Quant	Quant	10/29/91	10/29/91	10/29/91	10/29/91	10/28/91	10/29/91	10/29/91	10/29/91	10/29/91	10/29/91
Dilution Factor	Limit	Limit	12	12	1.0	1.4	1.2	12	1.5	1.1	1.1	12
Units	ug/L	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
BASE/NEUTRAL EXTRACTABLE COMPOUNDS												
Acenaphthene	2.3	220	500 J	795 J	103 J	283	U	U	U	U	28.5 J	336 J
Acenaphthylene	4.2	410	U	U	U	U	U	U	U	13.9 J	19.9 J	U J
Anthracene	2.3	220	590 J	1850 J	249 J	899	U	U	U	62.6 J	90.6 J	554 J
Benzo(a)anthracene	9.3	910	1520 J	8220 J	569 J	1610	U	U	U	189 J	268 J	1160 J
Benzo(a)pyrene	3.0	290	1440 J	6800	485	1340	U	U	U	202 J	287	1130
Benzo(b)fluoranthene	5.7	560	U	6940	852	1270	U	U	U	243 J	230 J	1140 J
Benzo(g,h,i)perylene	4.9	480	980 J	4050 J	322 J	943	U	U	U	U	228 J	U J
Benzo(k)fluoranthene	3.0	290	U	U	U	959	U	U	U	U	U	U
bis(2-Chloroethoxy)methane	6.3	620	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Bis(2-chloroethyl) ether	6.8	660	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
bis(2-chloroisopropyl)ether	6.8	660	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
bis(2-Ethylhexyl)phthalate	12	1200	U	U	276 B	222 JB	281 JB	U	1120 JB	232 JB	194 JB	U JB
4-Bromophenylphenyl ether	2.3	220	U	U	U	U	U	U	U	U	U	U
Butylbenzylphthalate	12	1200	U	U	U	U	U	U	U	U	U	U
2-Chloronaphthalene	2.3	220	U	U	U	U	U	U	U	U	U	U
4-Chlorophenylphenyl ether	5.0	490	U	U	U	U	U	U	U	U	U	U
Chrysene	3.0	290	1790 J	9460	708	1740	U	U	U	244 J	329	1420
Dbenz(a,h)anthracene	3.0	290	U	1060 J	U	U	U	U	U	U	U	U
1,2-Dichlorobenzene	2.3	220	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
1,3-Dichlorobenzene	2.3	220	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
1,4-Dichlorobenzene	5.2	510	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
3,3'-Dichlorobenzidine	19.6	1920	U	U	U	U	U	U	U	U	U	U
Diethylphthalate	12	1200	U	U	U	U	U	U	U	U	25.3 J	U J
Dimethylphthalate	12	1200	U	U	U	U	U	U	U	U	U	U
Di-n-butylphthalate	12	1200	1330 JB	1535 JB	2740 B	3650 B	1162 JB	1600 JB	2510 B	1800 B	2280 B	1410 B
2,4-Dinitrotoluene	6.8	660	U	U	U	U	U	U	U	U	U	U
2,6-Dinitrotoluene	2.3	220	U	U	U	U	U	U	U	U	U	U
Di-n-octylphthalate	12	1200	U	U	U	U	U	U	279 J	U	U	U
Fluoranthene	2.6	260	3450	14200	1300	8310	U	U	178 J	U	530	2680
Fluorene	2.3	220	700 J	1020 J	129 J	445	30 J	U	34.6 J	38.3 J	52 J	290 J
Hexachlorobenzene	2.3	220	U	U	U	U	U	U	U	U	U	2260
Hexachlorobutadiene	1.1	100	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Hexachlorocyclopentadiene	12	1200	U	U	U	U	U	U	U	U	U	U
Hexachloroethane	1.9	190	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Indeno(1,2,3-cd)pyrene	4.4	430	930 J	1920 J	U	903	U	U	U	U	187 J	U J
Isophorone	2.6	260	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Naphthalene	1.9	190	697 J	790 J	126 J	352 J	104 J	UJ	57.6 J	232 J	210 J	2510 J
Nitrobenzene	2.3	220	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
N-Nitroso-dimethylamine	12	1200	U	U	U	U	U	U	U	U	U	U
N-Nitroso-di-n-propylamine	12	1200	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
N-Nitroso-diphenylamine	2.3	220	U	U	U	U	U	U	U	U	U	U
Phenanthrene	6.4	630	3230 J	7800	1210	U	262 J	U	148 J	306 J	451 J	2750 J
Pyrene	2.3	220	3030	12000	1040	U	104 J	U	442	355	571	2300
1,2,4-Trichlorobenzene	2.3	220	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number			FG-5S	FG-5D	FG-6S	FG-6D	FG-10S	FG-11S	FG-11D	FG-15S	FILLDUP02	FG-15D
Sample Depth (ft)			6-8'	12-14'	6-8'	13-15'	6-8'	2-6'	14-16'	6-8'	6-8'	18-20'
Laboratory Sample Number			HA6493	HA6494	HA6642	HA6643	HA6489	HA6491	HA6492	HA6644	HA6645	HA6690
Sampling Date			10/29/91	10/29/91	10/29/91	10/29/91	10/28/91	10/29/91	10/29/91	10/29/91	10/29/91	10/29/91
Units	Quant Limit ug/L	Quant Limit ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/L	ug/Kg	ug/Kg	ug/Kg	ug/Kg
INORGANIC PARAMETERS												
Antimony	60	6000	U	U	BMDL	U	U	U	U	U	U	BMDL J
Arsenic	10	1000	30000	23000	13000	17000	BMDL J	6300	26000	1700	5000	3400 J
Barium	20	2000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium	1.0	100	3100	2000	3000	2600	1000	790	2300	2100	1800	660
Cadmium	2.0	200	7700	5700	4900	7100	2500	2800	9100	21000	28600	3200 J
Chromium	10	1000	55000	45000	29000	43000	31000	18000	62000	798000	596000	141000 J
Cobalt	20	2000	NA	NA	NA	NA	NA	NA	NA	NA	U	NA
Copper	10	1000	29000	51000	23000	34000	32000	46000	35000	48000	44000	26000 J
Lead	5.0	500	120000	120000	41000	88000	38000	74000	62000	43000	87000	30000 J
Mercury	0.20	80	BMDL B	140	BMDL B	180	BMDL B	100	BMDL B	BMDL B	U	BMDL B
Nickel	20	1000	25000	21000	20000	23000	31000	17000	36000	13000	9000	16000 J
Selenium	5.0	500	2900	3100	2400 J	2200 J	U	UJ	2600	BMDL J	UJ	BMDL J
Silver	10	1000	BMDL	BMDL	BMDL	BMDL	BMDL	BMDL	BMDL	3000	2700	BMDL
Thallium	10	1000	3700	2500	BMDL	2400	BMDL J	BMDL	3000	U	U	UJ
Tin	50	5000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	20	2000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	20	2000	308000	262000	190000	240000	79000	140000	341000	54000	100000	64000 J

LEGEND:

- U Compound was not detected at laboratory method detection limit.
  - J Estimated value due to limitations identified during the quality assurance review.
  - UJ Reported method detection limit is estimated due to limitations identified during the quality assurance review.
  - B Compound was detected in a laboratory and/or field blank at similar concentrations. May represent laboratory and/or field contamination.
  - R Unreliable result. Compound may or may not be present.
  - \* Sample analyzed at multiple dilutions. Summary table is a hybrid of diluted and undiluted results.
  - No standard available. Compound was qualitatively searched for.
  - IND Indeterminate. Standard and/or spikes could not be detected at method detection limit.
  - BMDL Below Method Detection Limit reported by laboratory.
- Discrepancies may exist between the laboratory data tables and the data validation summary tables due to variations in the rounding of calculations.

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number			FG-16S	FG-16D	FB-FILL02	TB102891	TB102991
Sample Depth (ft)			6-8'	18-20'	NA	NA	NA
Laboratory Sample Number			HA6646	HA6647	HA6505	HA6508	HA6509
Sampling Date	Quant	Quant	10/29/91	10/29/91	10/28/91	10/28/91	10/29/91
Dilution Factor	Limit	Limit	1.2	12.7	1.0	1.0	1.0
Units	ug/L	ug/Kg	ug/Kg	ug/Kg	ug/L	ug/L	ug/L
PRIORITY POLLUTANT P/T VOLATILE COMPOUNDS							
Benzene	4.4	4.4	14.6	1390	U	U	U
Bromoform	4.7	4.7	U	U	U	U	U
Carbon Tetrachloride	2.8	2.8	U	U	U	U	U
Chlorobenzene	6.0	6.0	U	495	U	U	U
Chlorodibromomethane	3.1	3.1	U	U	U	U	U
Chloroethane	10	10	U	U	U	U	U
2-Chloroethyl vinyl ether	10	10	U	U	U	U	U
Chloroform	1.6	1.6	U	U	U	U	U
Dichlorobromomethane	2.2	2.2	U	U	U	U	U
Dichlorodifluoromethane	10	10	U	U	U	U	U
1,1-Dichloroethane	4.7	4.7	U	U	U	U	U
1,2-Dichloroethane	2.8	2.8	U	U	U	U	U
1,1-Dichloroethene	2.8	2.8	U	U	U	U	U
1,2-Dichloropropane	6.0	6.0	U	U	U	U	U
cis-1,3-Dichloropropene	5.0	5.0	U	U	U	U	U
trans-1,3-Dichloropropene	10	10	U	U	U	U	U
Ethylbenzene	7.2	7.2	U	U	U	U	U
Methyl bromide	10	10	U	U	U	U	U
Methyl chloride	10	10	U	U	U	U	U
Methylene Chloride	2.8	2.8	U	U	U	U	U
1,1,2,2-Tetrachloroethane	4.1	4.1	U	U	U	U	U
Tetrachloroethene	4.1	4.1	U	U	U	U	U
Toluene	6.0	6.0	U	225	U	U	U
1,2-Dichloroethene (trans)	1.6	1.6	U	U	U	U	U
1,1,1-Trichloroethane	3.8	3.8	U	U	U	U	U
1,1,2-Trichloroethane	5.0	5.0	U	U	U	U	U
Trichloroethene	1.9	1.9	U	U	U	U	U
Trichlorofluoromethane	10	10	62 J	U	U	U	U
Vinyl Chloride	10	10	U	U	U	U	U

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number			FG-16S	FG-16D	FB-FILL02	TB102891	TB102991
Sample Depth (ft)			6-8'	18-20'	NA	NA	NA
Laboratory Sample Number			HA6646	HA6647	HA6505	HA6508	HA6509
Sampling Date	Quant	Quant	10/29/91	10/29/91	10/28/91	10/28/91	10/29/91
Dilution Factor	Limit	Limit	12	13	1.0	1.0	1.0
Units	ug/L	ug/Kg	ug/Kg	ug/Kg	ug/L	ug/L	ug/L
ACID EXTRACTABLE COMPOUNDS							
2-Chlorophenol	3.9	340	UJ	UJ	U	NA	NA
2,4-Dichlorophenol	3.2	280	402 J	UJ	U	NA	NA
2,4-Dimethylphenol	3.2	280	UJ	UJ	U	NA	NA
4,6-Dinitro-2-methylphenol	29	2400	U	U	U	NA	NA
2,4-Dinitrophenol	50	4300	U	U	U	NA	NA
2-Nitrophenol	4.3	370	UJ	UJ	U	NA	NA
4-Nitrophenol	2.9	240	U	U	UJ	NA	NA
4-Chloro-3-methylphenol	3.6	310	U	U	U	NA	NA
Pentachlorophenol	4.3	370	U	3450 J	U	NA	NA
Phenol	1.8	150	UJ	UJ	UJ	NA	NA
2,4,6-Trichlorophenol	3.2	280	U	U	U	NA	NA

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TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number			FG-16S 6-8' HA6646 10/29/91	FG-16D 18-20' HA6647 10/29/91	FB-FILL02 NA HA6505 10/28/91	TB102891 NA HA6508 10/28/91	TB102991 NA HA6509 10/29/91
Sample Depth (ft)							
Laboratory Sample Number							
Sampling Date	Quant	Quant	12	13	1.0	1.0	1.0
Dilution Factor	Limit	Limit	ug/Kg	ug/Kg	ug/L	ug/L	ug/L
Units	ug/L	ug/Kg					
BASE/NEUTRAL EXTRACTABLE COMPOUNDS							
Acenaphthene	2.3	220	214 J	736 J	U	NA	U
Acenaphthylene	4.2	410	U	U	U	NA	U
Anthracene	2.3	220	446 J	1320 J	U	NA	2100
Benzo(a)anthracene	9.3	910	1360 J	2205 J	U	NA	6000 J
Benzo(a)pyrene	3.0	290	1126 J	1936 J	U	NA	4740
Benzo(b)fluoranthene	5.7	560	1148 J	1692 J	U	NA	9290 J
Benzo(g,h,i)perylene	4.9	480	U	1259 J	U	NA	4200
Benzo(k)fluoranthene	3.0	290	786 J	U	U	NA	3600
bis(2-Chloroethoxy)methane	6.3	620	UJ	UJ	U	NA	U
Bis(2-chloroethyl) ether	6.8	660	UJ	UJ	U	NA	U
bis(2-chloroisopropyl) ether	6.8	660	UJ	UJ	U	NA	U
bis(2-Ethylhexyl)phthalate	12	1200	977 JB	U	U	NA	U
4-Bromophenylphenyl ether	2.3	220	U	U	U	NA	U
Butylbenzylphthalate	12	1200	U	U	UJ	NA	U
2-Chloronaphthalene	2.3	220	U	U	U	NA	U
4-Chlorophenylphenyl ether	5.0	490	U	U	U	NA	U
Chrysene	3.0	290	1440 J	2460 J	U	NA	7160 J
Dibenz(a,h)anthracene	3.0	290	U	U	U	NA	U
1,2-Dichlorobenzene	2.3	220	UJ	UJ	U	NA	U
1,3-Dichlorobenzene	2.3	220	UJ	UJ	U	NA	U
1,4-Dichlorobenzene	5.2	510	UJ	UJ	U	NA	U
3,3'-Dichlorobenzidine	19.6	1920	U	U	UJ	NA	U
Diethylphthalate	12	1200	U	U	R	NA	U
Dimethylphthalate	12	1200	U	U	R	NA	U
Di-n-butylphthalate	12	1200	1930 JB	1005 JB	U	NA	U J
2,4-Dinitrotoluene	6.8	660	U	U	U	NA	U
2,6-Dinitrotoluene	2.3	220	U	U	U	NA	U
Di-n-octylphthalate	12	1200	U	U	U	NA	U
Fluoranthene	2.6	260	2600 J	5090	U	NA	16100
Fluorene	2.3	220	247 J	833 J	U	NA	U
Hexachlorobenzene	2.3	220	U	U	U	NA	U
Hexachlorobutadiene	1.1	100	UJ	UJ	U	NA	U
Hexachlorocyclopentadiene	12	1200	U	U	U	NA	U
Hexachloroethane	1.9	190	UJ	UJ	U	NA	U
Indeno(1,2,3-cd)pyrene	4.4	430	U	1050 J	U	NA	4500
Isophorone	2.6	260	UJ	UJ	U	NA	U
Naphthalene	1.9	190	424 J	1050 J	U	NA	U
Nitrobenzene	2.3	220	UJ	UJ	U	NA	U
N-Nitroso-dimethylamine	12	1200	U	U	U	NA	U
N-Nitroso-di-n-propylamine	12	1200	UJ	UJ	U	NA	U
N-Nitroso-diphenylamine	2.3	220	U	U	U	NA	U
Phenanthrene	6.4	630	2241 J	5090 J	U	NA	10100 J
Pyrene	2.3	220	3020	4580 J	U	NA	12400
1,2,4-Trichlorobenzene	2.3	220	UJ	UJ	U	NA	U

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number			FG-16S	FG-16D	FB-FILL02	FG-9GW
Sample Depth (ft)			6-8'	18-20'	NA	NA
Laboratory Sample Number	Quant	Quant	HA6646	HA6647	HA6505	HA6530
Sampling Date	Limit	Limit	10/29/91	10/29/91	10/28/91	10/29/91
Units	ug/L	ug/Kg	ug/Kg	ug/Kg	ug/L	ug/L
<b>INORGANIC PARAMETERS</b>						
Antimony	60	6000	UJ	UJ	U	U
Arsenic	10	1000	10000	6700	U	BMDL
Barium	20	2000	NA	NA	NA	82
Beryllium	1.0	100	870	700	U	BMDL J
Cadmium	2.0	200	2400	3700	U	U
Chromium	10	1000	15000	32000	U	U
Cobalt	20	2000	NA	NA	NA	U
Copper	10	1000	35000	40000	U	BMDL J
Lead	5.0	500	130000	130000	U	BMDL J
Mercury	0.20	80	100	110	0.1 J	BMDL J
Nickel	20	1000	14000	29000	U	92 J
Selenium	5.0	500	BMDL J	BMDL J	U	8.0 J
Silver	10	1000	BMDL	BMDL	U	U
Thallium	10	1000	BMDL J	BMDL J	U	UJ
Tin	50	5000	NA	NA	NA	U
Vadadium	20	2000	NA	NA	NA	U
Zinc	20	2000	120000	120000	U	BMDL J

**LEGEND:**

- U Compound was not detected at laboratory method detection limit.
  - J Estimated value due to limitations identified during the quality assurance review.
  - UJ eported method detection limit is estimated due to limitations identified during the quality assurance review.
  - B Compound was detected in a laboratory and/or field blank at similar concentrations. May represent laboratory and/or field contamination.
  - R Unreliable result. Compound may or may not be present.
  - \* Sample analyzed at multiple dilutions. Summary table is a hybrid of diluted and undiluted results.
  - No standard available. Compound was qualitatively searched for.
  - IND Indeterminate. Standard and/or spikes could not be detected at method detection limit.
  - BMDL Below Method Detection Limit reported by laboratory.
- Discrepancies may exist between the laboratory data tables and the data validation summary tables due to variations in the rounding of calculations.





**DATA VALIDATION/QUALITY ASSURANCE REVIEW  
PHASE II RCRA FACILITY INVESTIGATION  
CHEM WASTE MANAGEMENT, INC. - CHICAGO INCINERATOR  
SAMPLE COLLECTION DATES: NOVEMBER 5 - NOVEMBER 6, 1991  
DAMES & MOORE JOB NO.: 13963-055-192**

**LABORATORY REPORT Nos.: 101406 & 101408**

**INTRODUCTION**

Six (6) soil samples, plus one field-duplicate soil sample, two (2) groundwater samples, one (1) field-duplicate groundwater sample, two (2) field-blank samples and one (1) trip-blank sample were collected and submitted to Environmental Testing Corporation (ETC) of Edison, New Jersey (1992 Illinois Certification No. 100224). All samples included in this review are listed on Table 1. All soil samples and the associated soil field-blank sample were analyzed for priority pollutant volatile organic compounds, semivolatile organic compounds (base/neutral and acid-extractable organic compounds) and metals. The soil trip-blank sample was analyzed for priority pollutant volatile organic compounds only. All groundwater samples were analyzed for RCRA Appendix IX heated purge and trap (HP/T) volatile organic compounds and purge and trap (P/T) volatile organic compounds, semivolatile organic compounds and metals. The groundwater trip-blank sample was analyzed for RCRA Appendix IX HP/T and P/T volatile organic compounds only. All samples were analyzed following USEPA SW-846 Methodologies.

A data validation review was performed on all samples prepared under a modified CLP-SOW 3/90 CLP-I data deliverable format. Data were examined to assess the usability of the results, as well as to assess compliance relative to data package deliverable requirements. The organic data review is based upon a rigorous review of the reported hold times, surrogate recoveries, blank spike recoveries, matrix spike and matrix spike duplicate summaries, blank contaminants, internal standard area performance, Gas Chromatography/Mass Spectroscopy (GC/MS) tuning and calibration data.

The inorganic data review is based on a review of the reported hold times, blank analysis results, blank spike recoveries, matrix spike and duplicate results, calibration results, post-digestion spike recoveries and Inductively Coupled Plasma (ICP) serial dilution analysis.

Details of the data validation/quality assurance review are presented in the narrative section of the report. The data is summarized in Table 2 of the report. Data qualifiers have been placed next to the results so that the data user can quickly assess the qualitative and/or quantitative reliability of the reported result. This report was prepared to provide a critical review of the laboratory analysis and reported

chemical results. Quality assurance reviews of laboratory-generated data routinely identify problems associated with analytical measurements, even from the most experienced and capable laboratories.

This review has been performed in accordance with the requirements specified in the "Laboratory Data Validation Functional Guidelines for Evaluating Organic Analyses" dated February 1988 and "Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses" dated July 1988.

**TABLE 1**  
**SAMPLES INCLUDED IN REVIEW**

<u>Sample ID</u>	<u>Lab ID</u>	<u>Date Collected</u>	<u>Test Requested</u>
<u>Log Link No. 101406</u>			
FG-14D	HA6495	11/05/91	PP VOA, PP BNA & PP Metals
FG-13S	HA6651	11/05/91	PP VOA, PP BNA & PP Metals
FG-13D	HA6652	11/05/91	PP VOA, PP BNA & PP Metals
FG-14S	HA6653	11/05/91	PP VOA, PP BNA & PP Metals
FG-12S	HA6648	11/06/91	PP VOA, PP BNA & PP Metals
FG-12D	HA6649	11/06/91	PP VOA, PP BNA & PP Metals
FILLDUP03	HA6650	11/06/91	PP VOA, PP BNA & PP Metals
<u>Log Link No. 101408</u>			
FILLFB03-(110591)	HA6507	11/05/91	PP VOA, PP BNA & PP Metals
TB-110591	HA6510	11/05/91	PP VOA
FG-1GW	HA6531	11/05/91	RCRA Appendix IX HP/T VOA, P/T VOA, BNA & Metals
GWDUP01	HA6532	11/05/91	RCRA Appendix IX HP/T VOA, P/T VOA, BNA & Metals
FG-12GW	HA6534	11/06/91	RCRA Appendix IX HP/T VOA, P/T VOA, BNA & Metals
TB(Relog)	HA6588	11/06/91	RCRA Appendix IX HP/T VOA & P/T VOA
<u>Legend:</u>			
PP VOA	=	Priority Pollutant Volatile Organic Compounds	
PP BNA	=	Priority Pollutant Semivolatile Organic Compounds (Base/Neutral and Acid-Extractable Compounds)	
PP Metals	=	Priority Pollutant Metals	
HP/T VOA	=	RCRA Appendix IX Heated Purge and Trap Volatile Organic Compounds	
P/T VOA	=	RCRA Appendix IX Purge and Trap Volatile Organic Compounds	
BNA	=	RCRA Appendix IX Semivolatile Organic Compounds (Base/Neutral and Acid-Extractable Compounds)	

## GENERAL COMMENTS

With regard to the data package deliverables, most of the requirements were met with the exception of the metals and volatile fractions.

- This reviewer has observed that for the ICP concentrations reported at 10 to 15 times above the method detection limit (MDL), the data validation cannot reproduce the laboratory reported results. The calculation obtained during data validation is consistently higher than the laboratory reported concentration. This is due to the fact that the interelement correction factors in the ICP instrument have been externally calculated in the system. Since this external interelement correction factor is not available for review, the reported results for low level samples cannot be reproduced. It should be noted that positive ICP reported results that are significantly above than the MDL (approximately 100 times higher or more) were reproduced and validated, since this interelement correction factor becomes negligible at higher concentrations. The data review assumes that the low level reported concentrations (10 to 15 times the MDL) are correct as reported and it is this reviewer's opinion that data usability is not impacted.
- In the volatile analysis of sample FG-14S, the concentration of ethylbenzene was reported as below the method detection limit (BMDL) of 96 ug/kg by the laboratory. The data validation has calculated an ethylbenzene concentration of 423 ug/kg for this sample.

## DATA QUALIFIERS

Overall, the data quality is good. The data validation review has identified aspects of the analytical data that require qualification. To confidently use any of the data within the data set, the data user should understand the limitations and qualifications presented. With regard to data usability, the following qualifiers are offered based upon the data provided.

### ORGANIC QUALIFIERS

Hold Times:

- All samples were analyzed and/or extracted within the required hold time criteria for all organic parameters.

#### Blank Contamination:

- Due to the presence of methylene chloride in the laboratory and/or field-blank sample associated with samples FILLFB03, FG-12D, FG-13D and FG-14D, the positive results of this compound in these samples are qualitatively questionable and have been flagged (B) on the summary tables.
- Although there is no reason to question the positive methylene chloride result in samples FG-12GW, it should be noted that methylene chloride is a common laboratory and field contaminant. Methylene chloride was also detected in samples FG-1GW and GWDUP01, however, the reported concentrations are greater than 10 times the blank concentration and are therefore regarded as "real" values.
- Although there is no reason to question the validity of the positive di-n-butyl phthalate results in the semivolatile analysis of samples FG-12S and FILLDUP03, it should be noted that phthalate esters are common laboratory and or field contaminants since they are found in percent concentrations in numerous plastics.

#### Surrogate Recoveries:

- The volatile surrogate, toluene-d8, was recovered outside the control limits (low) for sample FG-14S. The positive and non-detected results for this sample may be biased low and have been flagged (J/UJ) estimated on the summary table.
- The acid extractable surrogates, 2,4,6-tribromophenol for samples FG-12S and FILLDUP03 and phenol-d5 for sample FG-12GW were recovered outside the control limits (low for 2,4,6-tribromophenol and high for phenol-d5). No qualifier has been applied since only one surrogate per sample is outside the control limits.

#### Internal Standard Area Counts:

- The area counts of the semivolatile internal standards, perylene-d12 for samples FG-13S, FG-14S and FILLDUP03, and chrysene-d12 for sample FG-13S only, were reported outside the control limits (high). The positive results of compounds quantitated against these internal standards are regarded as estimated values and have been flagged (J) on the data table. The non-detected results quantitated against these internal standards are not impacted and no qualifier has been applied.

#### Matrix Spike and Matrix Spike Duplicate Summary (MS/MSD):

- The overall reproducibility of the duplicate heated purge and trap (HP/T) volatile analysis of sample FG-12GW is poor. The positive and non-detected results of all HP/T volatile compounds for this sample are regarded as estimated values and have been flagged (J/UJ) on the summary table.
- The reproducibilities of the semivolatile compounds, diethyl phthalate and dimethyl phthalate in the analysis of sample FG-12GW are poor. The non-detected results of these compounds for sample FG-12GW are regarded as estimated values and have been flagged (UJ) on the summary table.
- The volatile spiking compound, trichloroethene, was recovered outside the control limits (high) for samples FG-12SMS/MSD and FILLDUP03-MS/MSD and may be biased high. No qualifier has been applied since this compound was reported as non-detected in both unspiked samples.
- The acid-extractable spiking compound, phenol, was recovered outside the control limits (high) for samples FG-14DMS/MSD and may be biased high. No qualifier has been applied since this compound was non-detected in the unspiked sample.
- The acid extractable spiking compounds, phenol for samples FG-12GW-MS/MSD and 4-chloro-3-methylphenol for sample FG-12GWMS only, were recovered outside the control limits (high). The positive phenol result in the unspiked sample may be biased high and have been flagged (J) estimated. No qualifier has been applied to 4-chloro-3-methylphenol in the unspiked sample since the recovery of this compound in the matrix spike duplicate (MSD) sample is within control limits.
- The blank spike recoveries of acetonitrile and acrolein were outside the control limits (high) for data set (log link) 10148. The positive results of these compounds in all field samples may be biased high and have been flagged (J) estimated on the summary table. There is no impact on the data quality for non-detected results and no qualifier has been applied.
- The blank spike recoveries of 3-chloropropene, trans-1,3-dichloropropylene, methyl ethyl ketone, toluene, acetone, ethylbenzene, m-xylene and o&p-xylenes, associated with the RCRA Appendix IX P/T volatile of data set (log link) 10148, were outside the control limits (low). The positive and non-detected results of these compounds in the associated

samples may be biased low and have been flagged (J/UJ) estimated on the summary table.

- Sample FILLDUP03 was collected and submitted to the laboratory as a blind field-duplicate of sample FG-12S. For the most part, the reproducibility of the organic results are good, providing a positive indication of the precision associated with both field and laboratory techniques.
- Sample GWDUP01 was collected and submitted to the laboratory as a blind field-duplicate of sample FG1-GW. The reproducibility of the organic results are good, providing a positive indication of the precision associated with both field and laboratory techniques.

#### Initial and Continuing Calibrations:

- Samples FG-14D, FG-13S and FG-13D were analyzed for priority pollutant volatile organic at elevated dilutions due to target compound concentrations exceeding the linear calibration range requirements.
- Due to the high difference between the initial and continuing calibrations response factors (%RSD > 30% and %D > 25%), all positive results for the following volatile compounds have been flagged (J) estimated. The actual detection limit may be higher than reported and have been flagged (UJ) estimated on the summary tables.

<u>Analyte</u>	<u>Log Link</u>	<u>Associated Sample</u>
All HP/T Compounds	10148	TBRELOG, FG-1GW, GWDUP01 & FG12GW
1,2,3-Trichloropropane	10148	TB110591, FG-1GW, FG-12GW & TBRELOG
o&p-Xylenes	10148	All Samples
Methylene Chloride & Dichlorodifluoromethane	10148	FILLFB110591

- Due to the high difference between the initial and continuing calibration response factors, (%RSD > 30% and %D > 25%), all positive results for the following semivolatile compounds have been flagged (J) estimated. The actual detection limit may be higher than reported and have been flagged (UJ) estimated on the summary tables.

<u>Analyte</u>	<u>Log Link</u>	<u>Associated Sample</u>
N-Nitrosodimethylamine, 4-Nitro-phenol & 2,4-Dinitrophenol	10146	All Samples
Hexachlorocyclopentadiene & 7,12-Dimethylbenzo(a) anthracene	101468	FG-1GW, GWDUP01, FG-12GW

- The response factors of the following volatile compounds in the initial and/or continuing calibrations are less than 0.05. Positive results of these compounds in the associated samples may be biased low and have been flagged (J) estimated. The non-detected results are regarded as unreliable (compound may or may not be present) and have been flagged (R) on the summary table.

<u>Compound</u>	<u>Log Link</u>	<u>Associated Sample</u>
1,4-Dioxane, Acetonitrile & Acrylonitrile	10148	TBRELOG
Methyl Ethyl Ketone	10148	All Samples

#### Additional Comments:

- As per the requirements, all values calculated below the method detection limit should be considered estimated and have been flagged (J) on the data table.

### INORGANICS PARAMETER QUALIFIERS

#### Hold Times:

- All samples were digested and analyzed within the required hold time criteria for priority pollutant and RCRA Appendix IX metals analyses.

#### Blank Contamination:

- Trace presence of mercury and zinc for both data sets have been identified in the laboratory and/or field-blanks. The positive mercury and zinc results in the samples that have been reported as below the method detection limits (BMDL) are qualitatively questionable and have been flagged (B) on Table 2. The positive mercury and zinc results reported above the method detection limits (MDL) are regarded as "real" and no qualifier has been applied.

#### Instrument Calibration and Verification:

- The initial and continuing calibration verification recoveries of all metals were reported within control limits.

#### ICP Serial Dilution:

- The percent differences of the ICP serial dilution analyses of sample FG12GW were reported within control limits.

#### Matrix Spike and Duplicate Summary:

- All blank spike recoveries were reported within control limits providing a positive indication that the instrumental analysis was "in-control".
- Due to the low matrix spike recovery of selenium in sample FG-12-GWMS, the positive selenium result in the unspiked sample may be biased low and have been flagged (J) estimated.
- The relative percent differences (RPD) of the duplicate analyses of selenium and zinc in sample FG-12GWDUP are outside the control limits. The positive results of these analytes in the sample are regarded as estimated values and have been flagged (J) on the summary table.
- Sample FILLDUP03 was collected and submitted to the laboratory as a blind field duplicate of sample FG-12S. The reproducibility of the metals results are good, with the exception of lead. The concentration of lead in sample FG-12S was reported as 22000 ug/kg and the concentration of lead in sample FILLDUP03 was BMDL. The positive results of lead for these field duplicates are regarded as estimated values and have been flagged (J) on the summary tables.
- Sample GWDUP01 was collected and submitted to the laboratory as a blind field duplicate of sample FG1-GW. The reproducibility of the metals results are good, providing a positive indication of the precision associated with both field and laboratory techniques.

#### Post-Digestion Spike Recoveries:

- The post-spike recoveries of the following analytes were recovered outside the control limits (low). Positive and/or non-detected results of these analytes for the associated samples may be biased low and have been flagged (J) estimated.



<u>Analyte</u>	<u>Log Link</u>	<u>Associated Sample</u>
Arsenic	10148	FG-1GW, GWDUP01 & FG12GW
Lead	10148	FG12GW
Selenium	10146 10148	All Samples GWDUP01 & FG12GW
Thallium	10146 10148	FG-13D FILLFB110591

Additional Comments:

- The laboratory reports several inorganic results as below the method detection limit (BMDL). These are reported as BMDL on Table 2. The actual concentrations were not calculated during the data validation review since the interelement coefficient factors were not provided.

TABLE 2  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number			FG-1GW	GWDUP01	FG-12GW	TB-110691
Laboratory Sample Number			HA6531	HA6532	HA6534	HA6588
Sampling Date	Quant	Quant	11/05/91	11/05/91	11/06/91	11/06/91
Dilution Factor	Limit	Limit	5.0	5.0	1.0	1.0
Units	ug/L	ug/Kg	ug/L	ug/L	ug/L	ug/L
APPENDIX IX HEATED P/T VOLATILE COMPOUNDS						
Acetonitrile	15	15	902	785	15.6 J	R
Acrolein	20	20	U	U	UJ	R
Acrylonitrile	10	10	U	U	UJ	U
1,4-Dioxane	300	300	88.6 J	U	UJ	R
Ethyl cyanide	40	40	U	U	UJ	U
Isobutyl alcohol	230	230	U	U	UJ	U
Methacrylonitrile	110	110	U	U	UJ	U

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number Laboratory Sample Number Sampling Date Dilution Factor Units	Quant Limit ug/L	Quant Limit ug/Kg	FG-1GW HA6531 11/05/91 10 ug/L	GWDUP01 HA6532 11/05/91 10 ug/L	FG-12GW HA6534 11/06/91 2.5 ug/L	TB-110691 HA6588 11/06/91 1.0 ug/L
APPENDIX IX P/T VOLATILE COMPOUNDS						
Benzene	4.4	4.4	190 J	71.2 J	122	U
Methyl bromide	10	10	U	U	U	U
Carbon disulfide	10	10	U	U	U	U
Chloroethane	10	10	U	U	U	U
Chlorobenzene	6.0	6.0	U	U	21.0	U
2-Chloro-1,3-butadiene	-	-	U	U	U	U
Chloroform	1.6	1.6	U	U	U	U
Methyl chloride	10	10	U	U	U	U
3-Chloropropene	10	10	UJ	UJ	UJ	UJ
1,2-Dibromo-3-chloropropane	10	10	U	U	U	U
1,2-Dibromoethane	10	10	U	U	U	U
Dibromomethane	10	10	U	U	U	U
1,4-Dichloro-2-butene	10	10	U	U	U	U
Dichlorodifluoromethane	10	10	U	U	U	U
1,1-Dichloroethane	4.7	4.7	273	379	U	U
1,2-Dichloroethane	2.8	2.8	U	U	58.2	U
1,2-Dichloroethene (trans)	1.6	1.6	U	U	U	U
1,1-Dichloroethene	2.8	2.8	2450	3260	U	U
Methylene Chloride	2.8	2.8	1280	1540	27.3	U
1,2-Dichloropropane	6.0	6.0	U	U	U	U
cis-1,3-Dichloropropene	5.0	5.0	U	U	U	U
trans-1,3-Dichloropropene	10	10	UJ	UJ	UJ	UJ
Chlorodibromomethane	3.1	3.1	U	U	U	U
Dichlorobromomethane	2.2	2.2	U	U	U	U
Ethyl methacrylate	10	10	U	U	U	U
Iodomethane	10	10	U	U	U	U
Methyl ethyl ketone	10	10	R	R	R	R
Methyl methacrylate	10	10	U	U	U	U
Pentachloroethane	-	-	U	U	U	U
1,1,1,2-Tetrachloroethane	10	10	U	U	U	U
1,1,2,2-Tetrachloroethane	4.1	4.1	U	U	U	U
Tetrachloroethene	4.1	4.1	U	U	U	U
Carbon Tetrachloride	2.8	2.8	U	U	U	U
Toluene	6.0	6.0	61.6 J	61.6 J	479	UJ
Bromoform	4.7	4.7	U	U	U	U
1,1,1-Trichloroethane	3.8	3.8	U	U	U	U
1,1,2-Trichloroethane	5.0	5.0	U	U	U	U

continued on next page (see last page for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO INCINERATOR FACILITY

Dames and Moore Sample Number			FG-1GW	GWDUP01	FG-12GW	TB-110691
Laboratory Sample Number			HA6531	HA6532	HA6534	HA6588
Sampling Date	Quant	Quant	11/05/91	11/05/91	11/06/91	11/06/91
Dilution Factor	Limit	Limit	10	10	2.5	1.0
Units	ug/L	ug/Kg	ug/L	ug/L	ug/L	ug/L
APPENDIX IX P/T VOLATILE COMPOUNDS (continued)						
Trichloroethene	1.9	1.9	U	U	U	U
Trichlorofluoromethane	10	10	U	U	U	U
1,2,3-Trichloropropane	10	10	UJ	UJ	UJ	UJ
Vinyl Chloride	10	10	445	591	U	U
Acetone	10	10	1500 J	1890 J	499 J	UJ
Ethylbenzene	7.2	7.2	UJ	UJ	134 J	UJ
2-Hexanone	10	10	U	U	U	U
Methyl isobutyl ketone	10	10	U	U	582	U
Styrene	10	10	U	U	U	U
Vinyl acetate	10	10	U	U	U	U
m-Xylene	10	10	UJ	UJ	341 J	UJ
o,p-Xylenes	10	10	UJ	UJ	402 J	UJ

continued on next page (see last page for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number Laboratory Sample Number Sampling Date Dilution Factor Units	Quant Limit ug/L	Quant Limit ug/Kg	FG-1GW HA6531 11/05/91 10 ug/L	GWDUP01 HA6532 11/05/91 10 ug/L	FG-12GW HA6534 11/06/91 7.5 ug/L	TB-110691 HA6588 11/06/91 1.0 ug/L
APPENDIX IX SEMIVOLATILE COMPOUNDS						
Acetophenone	10	1000	U	U	U	NA
2-Acetylaminofluorene	10	1000	U	U	U	NA
4-Aminobiophenyl	10	1000	U	U	U	NA
Aniline	10	1000	194	225	418	NA
Aramite	10	1000	U	U	U	NA
Benzo(a)anthracene	8.0	790	U	U	U	NA
Benzo(b)fluoranthene	4.9	490	U	U	U	NA
Benzo(a)pyrene	2.6	250	U	U	U	NA
Bis(2-Chloroethoxy)methane	5.5	540	U	U	U	NA
Bis(2-chloroethyl) ether	5.9	580	U	U	U	NA
Bis(2-chloroisopropyl) ether	5.9	580	U	U	U	NA
Bis(2-Ethylhexyl)phthalate	10	1000	U	U	U	NA
4-Bromophenylphenyl ether	2.0	190	U	U	U	NA
Butylbenzylphthalate	10	1000	U	U	U	NA
2-sec-Butyl-4,6-dinitrophen	10	1000	U	U	U	NA
p-Chloroaniline	10	1000	103	125	1800	NA
p-Chloro-m-cresol	3.1	300	U	U	U	NA
2-Chloronaphthalene	2.0	190	U	U	U	NA
2-Chlorophenol	3.4	330	40.8	33.2	247	NA
Chrysene	2.6	250	U	U	U	NA
Acenaphthene	2.0	190	2.23	2.55	U	NA
Acenaphthylene	3.6	350	U	U	U	NA
Anthracene	2.0	190	U	U	U	NA
Benzo(ghi)perylene	3.2	415	U	U	U	NA
Benzo(k)fluoranthene	2.6	250	U	U	U	NA
Fluorene	2.0	190	2.18	2.57	U	NA
Phenanthrene	5.6	550	4.28 J	4.21 J	U	NA
Pyrene	2.0	190	1.42 J	1.55 J	U	NA
2-Nitrophenol	3.7	365	U	U	U	NA
o-Cresol	10	1000	4.04 J	5.56 J	70 J	NA
m+p-Cresols	10	1000	248	260	543	NA
Diallate	10	1000	U	U	U	NA
Dibenzo(a,h)anthracene	2.6	250	U	U	U	NA
Di-N-butyl phthalate	10	1000	U	U	U	NA
1,2-Dichlorobenzene	2.0	190	U	U	U	NA
1,3-Dichlorobenzene	2.0	190	U	U	U	NA
1,4-Dichlorobenzene	4.5	450	U	U	U	NA
3,3-Dichlorobenzidine	17	1675	U	U	U	NA
2,4-Dichlorophenol	2.8	275	193	205	1160	NA
2,6-Dichlorophenol	10	1000	57.5	58.8	250	NA

continued next page (see last page of table for notes)

TABLE 2  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number			FG-1GW	GWDUP01	FG-12GW	TB-110691
Laboratory Sample Number			HA6531	HA6532	HA6534	HA6588
Sampling Date	Quant	Quant	11/05/91	11/05/91	11/06/91	11/06/91
Dilution Factor	Limit	Limit	10	10	2.5	1.0
Units	ug/L	ug/Kg	ug/L	ug/L	ug/L	ug/L
APPENDIX IX SEMIVOLATILE COMPOUNDS (continued)						
Diethylphthalate	10	1000	U	U	UJ	NA
p-Dimethylaminoazobenzene	10	1000	U	U	U	NA
7,12-Dimethylbenzo(a)anthra	10	1000	U	U	U	NA
3,3-Dimethylbenzidine	10	1000	U	U	U	NA
a-a-Dimethylphenethylamine	-	-	-	-	-	NA
2,4-Dimethylphenol	2.8	275	21.3	24.1	41.2	NA
Dimethyl phthalate	10	1000	U	U	UJ	NA
m-Dinitrobenzene	10	1000	U	U	U	NA
4,6-Dinitro-0-cresol	25	2400	U	U	U	NA
2,4-Dinitrophenol	43	4250	U	U	U	NA
2,4-Dinitrotoluene	5.9	580	U	U	U	NA
2,6-Dinitrotoluene	2.0	190	U	U	U	NA
Di-n-octyl phthalate	10	1000	U	U	U	NA
Diphenylamine	10	1000	U	U	U	NA
N-nitrosodipropylamine	10	1000	U	U	U	NA
Ethyl methanesulfonate	10	1000	U	U	U	NA
Fluoranthene	2.3	225	1.55 J	1.77 J	U	NA
Hexachlorobenzene	2.0	190	U	U	U	NA
Hexachlorobutadiene	0.93	90	U	U	U	NA
Hexachlorocyclopentadiene	10	1000	U	U	U	NA
Hexachloroethane	1.6	165	U	U	U	NA
Isodrin	6.1	1000	U	U	U	NA
Hexachlorophene	10	1000	U	U	U	NA
Hexachloropropene	10	1000	U	U	U	NA
Indeno(1,2,3-c,d)pyrene	3.8	365	U	U	U	NA
Isosafrole	10	600	U	U	U	NA
Methapyrilene	-	-	IND	IND	IND	NA
3-Methylcholanthrene	5.7	555	U	U	U	NA
Methyl methanesulfonate	10	1000	U	U	U	NA
Naphthalene	1.6	165	22.4	29.8	41.8	NA
1,4-Naphthoquinone	10	1000	U	U	U	NA
1-Naphthylamine	10	1000	U	U	U	NA
2-Naphthylamine	10	1000	U	U	U	NA
p-Nitroaniline	10	1000	U	U	U	NA
Nitrobenzene	2.0	190	U	U	U	NA
4-Nitrophenol	2.5	240	U	U	U	NA
4-Nitroquinoline-N-oxide	-	-	IND	IND	IND	NA
N-Nitrosodiphenylamine	2.0	190	U	U	U	NA
N-Nitrosodi-n-butylamine	10	1000	U	U	U	NA
N-Nitrosodiethylamine	10	1000	U	U	U	NA
N-Nitrosodimethylamine	10	1000	U	U	U	NA
N-Nitrosomethylethylamine	10	1000	U	U	U	NA

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number			FG-1GW	GWDUP01	FG-12GW	TB-110691
Laboratory Sample Number			HA6531	HA6532	HA6534	HA6588
Sampling Date	Quant	Quant	11/05/91	11/05/91	11/06/91	11/06/91
Dilution Factor	Limit	Limit	10	10	2.5	1.0
Units	ug/L	ug/Kg	ug/L	ug/L	ug/L	ug/L
APPENDIX IX SEMIVOLATILE COMPOUNDS (continued)						
N-Nitrosomorpholine	10	1000	U	U	U	NA
N-Nitrosopiperidine	10	1000	U	U	U	NA
N-Nitrosopyrrolidine	10	1000	U	U	U	NA
5-Nitro-o-toluidine	10	1000	U	U	U	NA
Pentachlorobenzene	10	1000	U	U	U	NA
Pentachloronitrobenzene	10	1000	U	U	U	NA
Pentachlorophenol	3.7	365	U	U	U	NA
Phenacetin	10	1000	U	U	U	NA
Phenol	1.5	150	868	861	5120 J	NA
m-phenylenediamine	10	1000	U	U	U	NA
o-phenylenediamine	10	1000	U	U	U	NA
p-phenylenediamine	10	1000	U	U	U	NA
2-Picoline	10	1000	U	U	U	NA
Pronamide	10	1000	U	U	U	NA
Pyridine	10	1000	365	368	U	NA
Safrole	10	1000	U	U	U	NA
1,2,4,5-Tetrachlorobenzene	10	1000	U	U	U	NA
2,3,4,6-Tetrachlorophenol	10	1000	U	U	U	NA
Tetraethyldithiopyrophospha	-	-	U	U	U	NA
o-Toluidine	10	1000	U	U	81.5 J	NA
1,2,4-Trichlorobenzene	2.0	190	U	U	U	NA
2,4,5-Trichlorophenol	10	1000	U	U	U	NA
2,4,6-Trichlorophenol	2.8	275	4.02	4.27	44.4	NA
0,0,0-Triethyl phosphorothi	-	-	U	U	U	NA
sym-Trinitrobenzene	-	-	IND	IND	IND	NA
Benzyl alcohol	10	1000	U	U	U	NA
Dibenzofuran	10	1000	1.29 J	1.68 J	U	NA
Isophorone	2.3	225	U	U	U	NA
2-Methylnaphthalene	10	1000	7.58 J	6.80 J	U	NA
o-Nitroaniline	10	1000	U	U	U	NA
m-Nitroaniline	10	1000	U	U	U	NA
4-Chlorophenyl phenyl ether	4.3	425	U	U	U	NA

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number Laboratory Sample Number Sampling Date Units	Quant Limit ug/L	Quant Limit ug/Kg	FG-1GW HA6531 11/05/91 ug/L	GWDUP01 HA6532 11/05/91 ug/L	FG-12GW HA6534 11/06/91 ug/L	TB-110691 HA6588 11/06/91 ug/L
<b>INORGANIC PARAMETERS (METALS)</b>						
Antimony	60	6000	U	U	U	NA
Arsenic	10	1000	BMDL J	BMDL J	BMDL J	NA
Barium	20	2000	49	49	180	NA
Beryllium	1.0	100	U	U	BMDL	NA
Cadmium	2.0	200	U	U	U	NA
Chromium	10	1000	BMDL	BMDL	BMDL	NA
Cobalt	20	2000	U	U	U	NA
Copper	10	1000	U	BMDL	BMDL	NA
Lead	5.0	500	U	U	U	NA
Mercury	0.20	80	U	U	U	NA
Nickel	20	1000	BMDL	BMDL	51	NA
Selenium	5.0	500	BMDL	BMDL J	BMDL J	NA
Silver	10	1000	U	U	BMDL	NA
Thallium	10	1000	U	U	U	NA
Tin	50	5000	U	U	BMDL	NA
Vanadium	20	2000	BMDL	BMDL	54	NA
Zinc	20	2000	BMDL	BMDL	BMDL J	NA

continued next page (see last page of table for notes)



TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number			FG-12S	FG-12D	FILLDUP03	FG-13S	FG-13D	FG-14S	FG-14D	FILLFB03	TB-110591
Laboratory Sample Number			HA6648	HA6649	HA6650	HA6651	HA6652	HA6653	HA6495	HA6507	HA6510
Sampling Date	Quant	Quant	11/06/91	11/05/91	11/06/91	11/05/91	11/05/91	11/05/91	11/05/91	11/05/91	11/05/91
Dilution Factor	Limit	Limit	1.2	6.5	1.2	110	65	13	65	1.0	1.0
Units	ug/L	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/L	ug/L
PRIORITY POLLUTANT P/T VOLATILE COMPOUNDS											
Benzene	4.4	4.4	U	67.1	U	183 J	160 J	UJ	828	U	U
Bromoform	4.7	4.7	U	U	U	U	U	UJ	U	U	U
Carbon Tetrachloride	2.8	2.8	U	U	U	U	U	UJ	U	U	U
Chlorobenzene	6.0	6.0	U	U	2.2 J	577 J	181 J	UJ	70.6 J	U	U
Chlorodibromomethane	3.1	3.1	U	U	U	U	U	UJ	U	U	U
Chloroethane	10	10	U	U	U	U	U	UJ	U	U	U
2-Chloroethyl vinyl ether	10	10	U	U	U	U	U	UJ	U	U	U
Chloroform	1.6	1.6	U	U	U	U	U	UJ	U	U	U
Dichlorobromomethane	2.2	2.2	U	U	U	U	U	UJ	U	U	U
Dichlorodifluoromethane	10	10	U	U	U	U	U	UJ	U	UJ	U
1,1-Dichloroethane	4.7	4.7	U	U	U	U	U	UJ	U	U	U
1,2-Dichloroethane	2.8	2.8	U	U	U	U	U	UJ	U	U	U
1,1-Dichloroethene	2.8	2.8	U	U	U	U	460	UJ	U	U	U
1,2-Dichloropropane	6.0	6.0	U	U	U	U	U	UJ	U	U	U
cis-1,3-Dichloropropene	5.0	5.0	U	U	U	U	U	UJ	U	U	U
trans-1,3-Dichloropropene	10	10	U	U	U	U	U	UJ	U	U	U
Ethylbenzene	7.2	7.2	U	217	U	4070	946	423 J	623	U	U
Methyl bromide	10	10	U	U	U	U	U	UJ	U	U	U
Methyl chloride	10	10	U	U	U	U	U	UJ	U	U	U
Methylene Chloride	2.8	2.8	U	45.0 B	U	U	542 B	UJ	476 B	2.5 JB	U
1,1,2,2-Tetrachloroethane	4.1	4.1	U	U	U	U	U	UJ	U	U	U
Tetrachloroethene	4.1	4.1	U	U	U	410 J	141 J	UJ	U	U	U
Toluene	6.0	6.0	U	349	5.4 J	7110	4830	272 J	4200	U	U
1,2-Dichloroethene (trans)	1.6	1.6	U	U	U	U	U	UJ	U	U	U
1,1,1-Trichloroethane	3.8	3.8	U	U	U	U	U	UJ	U	U	U
1,1,2-Trichloroethane	5.0	5.0	U	U	U	U	U	UJ	U	U	U
Trichloroethene	1.9	1.9	U	U	U	188 J	U	UJ	U	U	U
Trichlorofluoromethane	10	10	U	U	U	U	U	UJ	U	U	U
Vinyl Chloride	10	10	U	U	U	U	U	UJ	U	U	U

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number			FG-12S	FG-12D	FILLDUP03	FG-13S	FG-13D	FG-14S	FG-14D	FILLFB03	TB-110591
Laboratory Sample Number			HA6648	HA6649	HA6650	HA6651	HA6652	HA6653	HA6495	HA6507	HA6510
Sampling Date			11/06/91	11/05/91	11/06/91	11/05/91	11/05/91	11/05/91	11/05/91	11/05/91	11/05/91
Dilution Factor	Quant	Quant	1.2	13	1.2	11	14	13	13	1.0	1.0
Units	Limit	Limit	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/L	ug/L
ACID EXTRACTABLE COMPOUNDS											
2-Chlorophenol	3.9	340	U	U	U	4610	3680 J	U	U	U	NA
2,4-Dichlorophenol	3.2	280	U	U	U	65000	44400	3054 J	2140 J	U	NA
2,4-Dimethylphenol	3.2	280	U	U	U	U	U	U	U	U	NA
4,6-Dinitro-2-methylphenol	29	2400	U	U	U	U	U	U	U	U	NA
2,4-Dinitrophenol	50	4300	U	U	U	U	U	U	U	U	NA
2-Nitrophenol	4.3	370	U	U	U	U	U	U	U	U	NA
4-Nitrophenol	2.9	240	U	U	U	U	U	U	U	U	NA
4-Chloro-3-methylphenol	3.6	310	U	U	U	U	U	U	U	U	NA
Pentachlorophenol	4.3	370	U	U	U	U	U	U	U	U	NA
Phenol	1.8	150	435	3180	396	1690	U	U	U	U	NA
2,4,6-Trichlorophenol	3.2	280	U	U	U	4650	2440 J	U	U	U	NA

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number Laboratory Sample Number Sampling Date Dilution Factor Units	Quant Limit ug/L	Quant Limit ug/Kg	FG-12S HA6648 11/06/91 1.2 ug/Kg	FG-12D HA6649 11/05/91 13 ug/Kg	FILLDUP03 HA6650 11/06/91 1.2 ug/Kg	FG-13S HA6651 11/05/91 11 ug/Kg	FG-13D HA6652 11/05/91 14 ug/Kg	FG-14S HA6653 11/05/91 13 ug/Kg	FG-14D HA6495 11/05/91 13 ug/Kg	FILLFB03 HA6507 11/05/91 1.0 ug/L	TB-110591 HA6510 11/05/91 1.0 ug/L
BASE/NEUTRAL EXTRACTABLE COMPOUNDS											
Acenaphthene	2.3	220	U	1400 J	U	U	U	U	U	U	NA
Acenaphthylene	4.2	410	U	U	U	U	U	U	U	U	NA
Anthracene	2.3	220	U	4320	U	U	U	U	1480 J	U	NA
Benzo(a)anthracene	9.3	910	U	5766 J	UJ	U	U	U	3790 J	U	NA
Benzo(a)pyrene	3.0	290	U	4680	UJ	UJ	U	UJ	3300	U	NA
Benzo(b)fluoranthene	5.7	560	U	3960 J	UJ	UJ	U	UJ	2690 J	U	NA
Benzo(g,h,i)perylene	4.9	480	U	U	UJ	UJ	U	UJ	U	U	NA
Benzo(k)fluoranthene	3.0	290	U	U	UJ	UJ	U	UJ	U	U	NA
bis(2-Chloroethoxy)methane	6.3	620	U	U	U	U	U	U	U	U	NA
Bis(2-chloroethyl) ether	6.8	660	U	U	U	U	U	U	U	U	NA
bis(2-chloroisopropyl)ether	6.8	660	U	U	U	U	U	U	U	U	NA
bis(2-Ethylhexyl)phthalate	12	1200	U	U	768 J	U	U	U	U	U	NA
4-Bromophenylphenyl ether	2.3	220	U	U	U	U	U	U	U	U	NA
Butylbenzylphthalate	12	1200	U	U	UJ	U	U	U	U	U	NA
2-Chloronaphthalene	2.3	220	U	U	U	U	U	U	U	U	NA
4-Chlorophenylphenyl ether	5.0	490	U	U	U	U	U	U	U	U	NA
Chrysene	3.0	290	U	6400	UJ	U	U	U	4480	U	NA
Dibenz(a,h)anthracene	3.0	290	U	U	UJ	UJ	U	UJ	U	U	NA
1,2-Dichlorobenzene	2.3	220	U	U	U	U	U	U	U	U	NA
1,3-Dichlorobenzene	2.3	220	U	U	U	U	U	U	U	U	NA
1,4-Dichlorobenzene	5.2	510	U	U	U	U	U	U	U	U	NA
3,3'-Dichlorobenzidine	19.6	1920	U	U	UJ	U	U	U	U	U	NA
Diethylphthalate	12	1200	U	U	U	U	U	U	U	U	NA
Dimethylphthalate	12	1200	U	U	U	U	U	U	U	U	NA
Di-n-butylphthalate	12	1200	8640	U	28300	U	U	U	U	U	NA
2,4-Dinitrotoluene	6.8	660	U	U	U	U	U	U	U	U	NA
2,6-Dinitrotoluene	2.3	220	U	U	U	U	U	U	U	U	NA
Di-n-octylphthalate	12	1200	U	U	UJ	UJ	U	UJ	U	U	NA
Fluoranthene	2.6	260	150 J	13700	U	U	U	U	7120	U	NA
Fluorene	2.3	220	U	3000	U	U	U	U	U	U	NA
Hexachlorobenzene	2.3	220	U	U	U	8930	3740	U	U	U	NA
Hexachlorobutadiene	1.1	100	U	U	U	U	U	U	U	U	NA
Hexachlorocyclopentadiene	12	1200	U	U	U	U	U	U	U	U	NA
Hexachloroethane	1.9	190	U	U	U	U	U	U	U	U	NA
Indeno(1,2,3-cd)pyrene	4.4	430	U	U	UJ	UJ	U	UJ	U	U	NA
Isophorone	2.6	260	U	U	U	U	U	U	U	U	NA
Naphthalene	1.9	190	U	2740	U J	1400	U	3830	2910	U	NA
Nitrobenzene	2.3	220	U	U	U	2480	U	U	U	U	NA
N-Nitroso-dimethylamine	12	1200	U	U	U	U	U	U	U	U	NA
N-Nitroso-di-n-propylamine	12	1200	U	U	U	U	U	U	U	U	NA
N-Nitroso-diphenylamine	2.3	220	U	U	U	U	U	U	U	U	NA
Phenanthrene	6.4	630	U	18800	U	U	U	U	7550	U	NA
Pyrene	2.3	220	115 J	11200	U	UJ	U	U	6710	U	NA
1,2,4-Trichlorobenzene	2.3	220	U	U	U	U	U	U	U	U	NA

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number Laboratory Sample Number Sampling Date Units	Quant Limit ug/L	Quant Limit ug/Kg	FG-12S HA6648 11/06/91 ug/Kg	FG-12D HA6649 11/05/91 ug/Kg	FILLDUP03 HA6650 11/06/91 ug/Kg	FG-13S HA6651 11/05/91 ug/Kg	FG-13D HA6652 11/05/91 ug/Kg	FG-14S HA6653 11/05/91 ug/Kg	FG-14D HA6495 11/05/91 ug/Kg	FILLFB03 HA6507 11/05/91 ug/L	TB-110591 HA6510 11/05/91 ug/L
INORGANIC PARAMETERS (METALS)											
Antimony	60	6000	U	U	U	U	U	U	U	U	NA
Arsenic	10	1000	2100	4100	1900	2400	5600	25000	18000	U	NA
Beryllium	1.0	100	660	1200	690	480	1200	2900	1100	U	NA
Cadmium	2.0	200	870	3300	1100	800	2500	9200	4200	U	NA
Chromium	10	1000	7400	36000	9000	11000	27000	66000	25000	U	NA
Copper	10	1000	7300	17000	9400	8000	18000	30000	33000	U	NA
Lead	5.0	500	22000 J	24000	BMDL J	29000	55000	39000	100000	U	NA
Mercury	0.20	80	U	BMDL B	BMDL B	U	BMDL B	U	160	U	NA
Nickel	20	1000	4100	15000	5300	7100	21000	33000	34000	BMDL	NA
Selenium	5.0	500	BMDL J	BMDL J	BMDL J	BMDL J	820 J	4500 J	1700 J	U	NA
Silver	10	1000	BMDL	BMDL	U	BMDL	U	BMDL	BMDL	U	NA
Thallium	10	1000	U	U	U	U	BMDL J	2500	1800	UJ	NA
Zinc	20	2000	21000	77000	23000	42000	100000	369000	130000	BMDL	NA

LEGEND:

- U Compound was not detected at laboratory method detection limit.
  - J Estimated value due to limitations identified during the quality assurance review.
  - UJ eported method detection limit is estimated due to limitations identified during the quality assurance review.
  - B Compound was detected in a laboratory and/or field blank at similar concentrations. May represent laboratory and/or field contamination.
  - R Unreliable result. Compound may or may not be present.
  - \* Sample analyzed at multiple dilutions. Summary table is a hybrid of diluted and undiluted results.
  - No standard available. Compound was qualitatively searched for.
  - IND Indeterminate. Standard and/or spikes could not be detected at method detection limit.
  - BMDL Below Method Detection Limit reported by laboratory.
- Discrepancies may exist between the laboratory data tables and the data validation summary tables due to variations in the rounding of calculations.



**DATA VALIDATION/QUALITY ASSURANCE REVIEW  
PHASE II RCRA FACILITY INVESTIGATION  
CHEM WASTE MANAGEMENT, INC. - CHICAGO INCINERATOR  
SAMPLE COLLECTION DATES: NOVEMBER 7 - NOVEMBER 12, 1991  
DAMES & MOORE JOB NO.: 13963-055-192**

**LABORATORY REPORT Nos.: 101414, 101415 & 101417**

**INTRODUCTION**

Four (4) groundwater samples, three (3) soil samples, two (2) sediment samples, plus one (1) sediment field-duplicate sample, six (6) surface water samples, plus one (1) surface water field-duplicate, one field-blank sample and three (3) trip-blank samples were collected and submitted to Environmental Testing Corporation (ETC) of Edison, New Jersey (1992 Illinois Certification No. 100224). All samples included in this review are listed on Table 1. All groundwater samples, soil samples and the field-blank sample were analyzed for RCRA Appendix IX heated purge and trap volatile organic compounds (HP/T VOA), purge and trap volatile organic compounds (P/T), semivolatile organic compounds (base/neutral and acid-extractable organic compounds) and metals. The two (2) trip-blank samples were analyzed for RCRA Appendix IX HP/T VOA and P/T VOA only. All surface water samples and sediment samples were analyzed for priority pollutant volatile organic compounds, semivolatile organic compounds and metals. The associated trip-blank sample was analyzed for priority pollutant volatile organic compounds only. All samples were analyzed following USEPA SW-846 Methodologies.

A data validation review was performed on all samples prepared under a modified CLP-SOW 3/90 CLP-I data deliverable format. Data were examined to assess the usability of the results, as well as to assess compliance relative to data package deliverable requirements. The organic data review is based upon a rigorous review of the reported hold times, surrogate recoveries, blank spike recoveries, matrix spike and matrix spike duplicate summaries, blank contaminants, internal standard area performance, Gas Chromatography/Mass Spectroscopy (GC/MS) tuning and calibration data.

The inorganic data review is based on a review of the reported hold times, blank analysis results, blank spike recoveries, matrix spike and duplicate results, calibration results, post-digestion spike recoveries and Inductively Coupled Plasma (ICP) serial dilution analysis.

Details of the data validation/quality assurance review are presented in the narrative section of the report. The data is summarized in Table 1 of the report. Data qualifiers have been placed next to the results so that the data user can quickly assess the qualitative and/or quantitative reliability of the reported result. This report

was prepared to provide a critical review of the laboratory analysis and reported chemical results. Quality assurance reviews of laboratory-generated data routinely identify problems associated with analytical measurements, even from the most experienced and capable laboratories.

This review has been performed in accordance with the requirements specified in the "Laboratory Data Validation Functional Guidelines for Evaluating Organic Analyses" dated February 1988 and "Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses" dated July 1988.

**TABLE 1**  
**SAMPLES INCLUDED IN REVIEW**

<u>Sample ID</u>	<u>Lab ID</u>	<u>Date Collected</u>	<u>Test Requested</u>
<u>Laboratory Report No. 101414</u>			
FG-2GW	HA6533	11/06/91	RCRA Appendix IX HP/T VOA, P/T VOA, BNA & Metals
TB-110691	HA6589	11/06/91	RCRA Appendix IX HP/T VOA & P/T VOA
C-2R-5	HA6662	11/07/91	RCRA Appendix IX HP/T VOA, P/T VOA, BNA & PP Metals
C-2R-15	HA6663	11/07/91	RCRA Appendix IX HP/T VOA, P/T VOA, BNA & PP Metals
S-6	HA6672	11/08/91	PP VOA, PP BNA & PP Metals
S-8	HA6681	11/08/91	PP VOA, PP BNA & PP Metals
SEDDUP01	HA6682	11/08/91	PP VOA, PP BNA & PP Metals
SWDUP01	HA6697	11/08/91	PP VOA, PP BNA & PP Metals
SW-14	HA6698	11/08/91	PP VOA, PP BNA & PP Metals
SW-13	HA6699	11/08/91	PP VOA, PP BNA & PP Metals
SW-11	HA6701	11/08/91	PP VOA, PP BNA & PP Metals
SW-8	HA6702	11/08/91	PP VOA, PP BNA & PP Metals
SW-12	HA6704	11/08/91	PP VOA, PP BNA & PP Metals
SW-6	HA6705	11/08/91	PP VOA, PP BNA & PP Metals
TB-110891	HA6708	11/08/91	PP VOA
<u>Laboratory Report No. 101415</u>			
C-2R-40	HA6664	11/11/91	RCRA Appendix IX HP/T VOA, P/T VOA, BNA & Metals
FG-7GW	HA6536	11/11/91	RCRA Appendix IX HP/T VOA, P/T VOA, BNA & Metals

<u>Sample ID</u>	<u>Lab ID</u>	<u>Date Collected</u>	<u>Test Requested</u>
<u>Laboratory Report No. 101417</u>			
FG-8GW	HA6537	11/12/91	RCRA Appendix IX HP/T VOA, P/T VOA, BNA & Metals
FG-5GW	HA6538	11/12/91	RCRA Appendix IX HP/T VOA, P/T VOA, BNA & Metals
GWFB111291	HA6583	11/12/91	RCRA Appendix IX HP/T VOA, P/T VOA, BNA & Metals
GWTB111291	HA6590	11/12/91	RCRA Appendix IX HP/T VOA, P/T VOA

Legend:

PP VOA	=	Priority Pollutant Volatile Organic Compounds
PP BNA	=	Priority Pollutant Semivolatile Organic Compounds (Base/Neutral and Acid-Extractable Organic Compounds)
PP Metals	=	Priority Pollutant Metals
HP/T VOA	=	RCRA Appendix IX Heated Purge and Trap Volatile Organic Compounds
P/T VOA	=	RCRA Appendix IX Purge and Trap Volatile Organic Compounds
BNA	=	RCRA Appendix IX Semivolatile Organic Compounds (Base/Neutral and Acid-Extractable Organic Compounds)

### GENERAL COMMENTS

With regard to the data package deliverables, most of the requirements were met with the exception of the metals fraction. This reviewer has observed that for the ICP concentrations reported at 10 to 15 times above the method detection limit (MDL), the data validation cannot reproduce the laboratory reported results. The calculation obtained during data validation is consistently higher than the laboratory reported concentration. This is due to the fact that the interelement correction factors in the ICP instrument have been externally calculated in the system. Since this external interelement correction factor is not available for review, the reported results for low level samples cannot be reproduced. It should be noted that positive ICP reported results that are significantly above than the MDL (approximately 100 times higher or more) were reproduced and validated, since this interelement correction factor becomes negligible at higher concentrations. The data review assumes that the low level reported concentrations (10 to 15 times the MDL) are correct as reported and that it is this reviewer's opinion that data usability is not impacted.

### DATA QUALIFIERS

Overall, the data quality is good. The data validation review has identified aspects of the analytical data that require qualification. To confidently use any of the data within the data set, the data user should understand the limitations and



qualifications presented. With regard to data usability, the following qualifiers are offered based upon the data provided.

### ORGANIC QUALIFIERS

#### Hold Times:

- The surface water sample, SW-6, was extracted for semivolatile organic 11 days outside the hold time requirement. Due to the hold time exceedence, the semivolatile results for this sample are unreliable and have been flagged (R) on the summary table.

#### Blank Contamination:

- Due to the presence of methylene chloride in the volatile laboratory blank and field-blank samples associated with all groundwater samples (FG-2GW, FG-7GW, FG-8GW and FG-5GW) and all surface water samples (SW-14, SW-13, SW-11, SW-8 & SW-12), the positive methylene chloride results in the aforementioned samples are qualitatively questionable and have been flagged (B) on the Table 2.
- Due to the presence of di-n-butyl phthalate and bis(2-ethylhexyl)phthalate in the semivolatile laboratory blanks associated with samples C-2R-5, C-2R-15, S-6, S-8, SEDDUP01 and C-2R-40, and the presence of di-n-octyl phthalate in the laboratory blank associated with S-6, S-8 and SEDDUP01, the positive results of these compounds in these samples are qualitatively questionable and have been flagged (B) on the summary table.

#### Surrogate Recoveries:

- The volatile surrogate, toluene-d8, was recovered outside the control limits (high) for the soil sample C-2R-15. The volatile results for this sample may be biased high; however, the data have been flagged based on the assessment of the volatile internal standard area performance (see Internal Standard Area Counts Section of this report).
- The volatile surrogate, toluene-d8, was recovered outside the control limits (low) for the trip-blank sample TB-110791. The non-detected results of this sample may be biased low and have been flagged (UJ) estimated.
- The base/neutral surrogate, 2-fluorobiphenyl, was recovered outside the control limits (high) for the sediment sample S-6. Positive results may

be biased high; however, no qualifier has been applied since only one surrogate per sample is outside the control limits.

- The base/neutral surrogates, 2-fluorobiphenyl and terphenyl-d14, were recovered outside the control limits (low) for the groundwater sample FG-2GW. The sample was re-analyzed with these surrogates outside the control limits (low), which may indicate matrix effects. The initial analysis results were reported by the laboratory and are summarized on Table 2. The positive and non-detected base/neutral results for this sample may be biased low and have been flagged (J/UJ) estimated on the summary tables.
- The acid-extractable surrogate, phenol-d5, was recovered less than 10% for the groundwater sample FG-8GW. This sample was re-analyzed with this surrogate recovered less than 10% which may indicate a matrix effect. Due to the extremely low surrogate recovery, the non-detected acid-extractable results are regarded as unreliable and have been flagged (R) on Table 2. The positive acid-extractable compounds for this sample may be biased low and have been flagged (J) estimated.
- The acid-extractable surrogates, 2-fluorophenol and 2,4,6-tribromophenol for the surface water samples SWDUP01, SW-13 and SW-8, and phenol-d5 and 2,4,6-tribromophenol for the groundwater sample FG-5GW, were recovered less than 10%. The samples were re-analyzed with the surrogates recovered at less than 10%, which may indicate matrix effects. The positive acid-extractable results for these samples may be biased low and have been flagged (J) estimated. The non-detected acid-extractable results are deemed unreliable and have been flagged (R) on the summary tables.

#### Internal Standard Area Counts:

- All volatile internal standard area counts for the soil sample C-2R-15 were outside the control limits (low). The positive and non-detected results for this sample are regarded as estimated values and have been flagged (J/UJ) on the summary tables.
- The internal standard area performance of the following semivolatile internal standards was outside the control limits (low) for the associated samples. The positive and non-detected results quantitated against this internal standard are regarded as estimated values and have been flagged (J/UJ) on the summary tables.

<u>Internal Standard</u>	<u>Associated Sample</u>
Chrysene-d12 & Perylene-d12	SWDUP01, SW-14, SW-8 & FG-7GW
Phenanthrene-d10 & Perylene-d12	FG-2GW
Perylene-d12	S-8 & SW-11
1,4-Dichlorobenzene-d4	FG-5GW

**Matrix Spike and Matrix Spike Duplicate Summary (MS/MSD):**

- All heated purge and trap volatile (HP/T VOA) blank spike recoveries were outside the control limits (low). With the exception of acrolein, the positive and non-detected results of all other HP/T VOA compounds may be biased low and have been flagged (J/UJ) estimated. Since the blank spike was not recovered (0%) for acrolein, the non-detected results of this compound in the samples are regarded as unreliable and have been flagged (R) on the summary tables.
- The volatile blank spike recoveries of trans-1,3-dichloropropylene, toluene, acetone, ethylbenzene, m-xylene and o,p-xylenes, associated with samples FG-2GW, FG-7GW, FG-8GW, GW-FB111291 and TB-111291, were outside the control limits (low). The positive and non-detected results of these compounds are regarded as estimated values and have been flagged (J/UJ) on the summary tables.
- The volatile blank spiking compound, 3-chloropropene, associated with the aforementioned groundwater samples, and the field and trip-blank samples, was not recovered (0%). The non-detected results of this compound are regarded as unreliable and have been flagged (R) on the summary tables.
- The volatile blank spike recoveries of methyl bromide, methyl chloride, dibromomethane, dichlorodifluoromethane, iodomethane, bromoform, trichlorotrifluoromethane, 1,2,3-trichloropropane and vinyl chloride, were recovered outside the control limits (high) for samples FG-2GW, FG-7GW, FG-8GW, GW-FB111291 and TB-111291. The positive results of these compounds may be biased high and have been flagged (J) estimated. There is no impact on the data quality for the non-detected results and no qualifier has been applied.
- The volatile blank spike recoveries of toluene and trans-1,3-dichloropropylene, associated with all surface water samples (SWDUP01, SW-14, SW-13, SW-11, SW-8 and SW-12) and TB-111791, were outside the

control limits (low). The positive and non-detected results of these compounds have been flagged (J/UJ) estimated

- The volatile blank spiking compounds, bromoform, dichlorodifluoromethane, methyl bromide, methyl chloride, trichlorotrifluoromethane and vinyl chloride, associated with samples SWDUP01, SW-14, SW-13, SW-11, SW-8, SW-12 and TB-111791, were recovered outside the control limits (high). The positive results may be biased high and have been flagged (J) estimated. There is no impact on the data quality for the non-detected results and no qualifier has been applied.
- Due to the low volatile blank spike recoveries of methyl bromide, methyl chloride, dichlorofluoromethane, methylene chloride, trans-1,3-dichloropropylene, toluene, vinyl chloride, acetone, ethyl benzene and m-xylene, associated with samples C-2R-5, C-2R-40, S-6 and SEDDUP01, and acetone, ethyl benzene and m-xylene for samples C-2R-5 and C-2R-40 only, the positive and non-detected results of these compounds may be biased low and have been flagged (J/UJ) estimated on Table 2.
- The volatile blank spike recovery of o,p-xylenes, associated with samples C-2R-5 and C-2R-40 is less than 10%. The non-detected o,p-xylenes results for both samples are regarded as unreliable and have been flagged (R) on the summary tables.
- Due to the low blank spike recoveries of the volatile compounds, ethylbenzene, toluene and trans-1,3-dichloropropylene, associated with the sediment sample S-8, the non-detected results may be biased low and have been flagged (UJ) estimated.
- The reproducibility of the semivolatile spiking compounds, phenol for the groundwater samples FG-2GW and FG-7GW, and 2-chlorophenol, 1,4-dichlorobenzene, n-nitroso-di-n-propylamine, 1,24-trichlorobenzene and 2,4-dinitrotoluene for sample FG-2GW only, were poor. The positive and non-detected results of these compounds are estimated values and have been flagged (J/UJ) on the summary tables.
- The acid-extractable matrix spiking compounds, 4-nitrophenol and pentachlorophenol for samples FG-2GWMS/MSD were recovered less than 10%. The non-detected results of these compounds in the unspiked sample are regarded as unreliable and have been flagged (R) on the summary tables.
- The acid-extractable matrix spiking compound, 4-nitrophenol for samples FG-7GWMS/MSD was not recovered. The non-detected 4-nitrophenol

result in the unspiked sample is regarded as unreliable and has been flagged (R) on the summary tables.

- The base/neutral spiking recoveries of p-chloroaniline, 3,3'-dichlorobenzidine, diethyl phthalate and dimethyl phthalate, associated with the groundwater sample FG-2GW, were less than 10%. The positive results of these compounds in the sample may be biased low and have been flagged (J) estimated. The non-detected results are regarded as unreliable and have been flagged (R) on the summary tables.
- The semivolatile matrix spiking compound, n-nitroso-di-n-propylamine was recovered outside the control limits (low) for samples C-2R-40MS-/MSD. The non-detected result of this compound in the unspiked sample may be biased low and have been flagged (UJ) estimated on the summary tables.
- The semivolatile blank spike recovery of p-chloroaniline, associated with samples C-2R-5, C-2R-15 and C-2R-40, was outside the control limits (low). The non-detected results of this compound for the sample may be biased low and have been flagged (UJ) estimated.
- The semivolatile blank spike recovery of 2-chlorophenol, associated with samples C-2R-5, C-2R-15, S-6, S-8, SEDDUP01 and C-2R-40, was not recovered (0%). The non-detected results of this compound in the samples are unreliable (compound may or may not be present) and have been flagged (R) on Table 2.
- Sample SWDUP01 was collected and submitted to the laboratory as a blind field-duplicate of sample SW-13. The reproducibility of the organic results are good, providing a positive indication of the precision and accuracy associated with both field and laboratory techniques.
- Sample SEDDUP01 was collected and submitted to the laboratory as a blind field-duplicate of sample S-8. The reproducibility of the volatile and acid-extractable organic results are good. However, several base/neutral extractable compound were detected in sample SEDDUP01 which were reported as non-detected in sample S-8. For both field-duplicates, the positive base/neutral results are regarded as estimated values and have been flagged (J) on Table 2.

#### Initial and Continuing Calibrations:

- The groundwater samples FG-2GW and FG-7GW were re-analyzed for volatiles at higher dilutions due to target compound concentrations

exceeding the linear calibration range requirements. The volatile results reported on Table 2 are a hybrid of both initial and dilution analyses.

- The groundwater sample FG-7GW was analyzed at a 1:500 dilution for HP/T VOA due to acetonitrile concentrations exceeding the linear calibration range requirements.
- The groundwater sample FG-5GW was analyzed at a 1:500 dilution for HP/T VOA; however, no target compounds were reported. Good laboratory practice calls for re-analysis when a dilution run is found to be non-detected.
- Due to the high difference between the initial and continuing calibrations response factors (%D > 25%), all positive results for the following volatile compounds have been flagged (J) estimated. The actual detection limit may be higher than reported and have been flagged (UJ) estimated on the summary tables.

<u>Analyte</u>	<u>Log Link</u>	<u>Associated Sample</u>
All HP/T VOA Cmpds.	101414 101415 101417	FG-2GW & TB-110691 FG-7GW FG-5GW
Ethyl Cyanide	101414	C-2R-5 & C-2R-15
Isobutyl Alcohol	101414 101417	C-2R-5 & C-2R-15 FG-8GW
Methacrylonitrile	101414 101415	FG-8GW, C-2R-5 & C-2R-15 C-2R-40
Acetonitrile	101417	FG-8GW

- Due to the high difference between the initial and continuing calibration response factor (%D > 25%) of the semivolatile compound, hexachlorophene associated with sample FG-7GW, the non-detected result of this compound may be higher than reported and have been flagged (UJ) estimated on the summary tables.
- The response factor of the following organic compounds is less than 0.05 for the initial and/or continuing calibrations. The positive results of these compounds in the associated samples may be biased low and have been flagged (J) estimated. The non-detected results are regarded as unreliable and have been flagged (R) on the summary tables.

<u>Compound</u>	<u>Fraction</u>	<u>Associated Sample</u>
1,4-Dioxane, Acrolein & Acetonitrile	HP/T VOA	C-2R-5, C-2R-15, C-2R-40 & FG-8GW
Methyl Ethyl Ketone	P/T VOA	All RCRA P/T VOA Samples
3,3'-Dimethylbenzidine	BNA	FG-7GW

**Additional Comments:**

- As per the requirements, all values calculated below the method detection limit should be considered estimated and have been flagged (J) on the data table.

**INORGANICS PARAMETER QUALIFIERS**

**Hold Times:**

- All samples were digested and analyzed within the required hold time criteria for metals analyses.

**Blank Contamination:**

- No blank contaminants have been identified that require qualification of samples reviewed.

**Instrument Calibration and Verification:**

- The initial and continuing calibration verification recoveries of all metals were reported within control limits.

**ICP Serial Dilution:**

- The ICP serial dilution was performed on a non-project batch sample for the soil and sediment matrices. Although the percent differences (%D) of some analytes were outside the control limits for the serial dilution analysis, no qualifier has been applied.
- The ICP serial dilution associated with the groundwater and surface water samples were within control limits.

#### Matrix Spike and Duplicate Summary:

- All blank spike and matrix spike recoveries were reported within control limits.
- The relative percent differences (RPD) associated with all duplicate analyses were reported within control limits.
- Sample SWDUP01 was collected and submitted to the laboratory as a blind field-duplicate of the surface water sample SW-13. The reproducibility of the metal results are good, providing a positive indication of the precision and accuracy associated with both field and laboratory techniques.
- Sample SEDDUP01 was collected and submitted to the laboratory as a blind field duplicate of the sediment sample S-8. The reproducibility of the metals results are good, with the exception of chromium, lead and nickel. The positive results of these analytes in these field duplicate samples are regarded as estimated values and have been flagged (J) on the summary tables.

#### Post-Digestion Spike Recoveries:

- The post-spike recoveries of the following analytes were recovered outside the control limits (low). Positive and/or non-detected results of these analytes for the associated samples may be biased low and have been flagged (J/UJ) estimated.

<u>Analyte</u>	<u>Log Link</u>	<u>Associated Sample</u>
Arsenic	101417	GWFB111291
Selenium	101414	SWDUP01, SW-14, SW-13, SW-11, SW-8, SW-12, SW-6, C-2R-5, S-6, & SEDDUP01
	101415	FG-7GW
	101417	GWFB111291
Lead	101414	C-2R-5 & C-2R-15
	101415	C-2R-40
Thallium	101414	SWDUP01, SW-14, SW-13, SW-8 & SW-6
	101415	FG-7GW
	101417	FG-5GW



- The post-spike recoveries of selenium and thallium for samples, MW-21 and SW-41 were recovered outside the control limits (high) and may be biased high. No qualifier has been applied since these analytes were non-detected in the associated samples.

Additional Comments:

- The laboratory reports several inorganic results as below the method detection limit (BMDL). These are reported as BMDL on Table 2. The actual concentrations are not calculated during the data validation review since the interelement coefficient factors were not provided.

TABLE 2  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number			C-2R-5	C-2R-15	C-2R-40	FG-2GW	FG-5GW	FG-7GW	FG-8GW	GWFB-01	TB-01101	TB-01291
Sample Depth (ft)			20-22'	30-32'	54-56'	9-11.5'	9-13'	9-12'	9-13'	NA	NA	NA
Laboratory Sample Number			HA6662	HA6663	HA6664	HA6533	HA6538	HA6536	HA6537	HA6583	HA6589	HA6590
Sampling Date	Quant	Quant	11/07/91	11/07/91	11/11/91	11/06/91	11/12/91	11/11/91	11/12/91	11/12/91	11/11/91	11/12/91
Dilution Factor	Limit	Limit	1.2	1.3	1.2	1.0	500	500	1.0	1.0	1.0	1.0
Units	ug/L	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
APPENDIX IX HEATED P/T VOLATILE COMPOUNDS												
Acetonitrile	15	15	R	3040 J	R	219 J	UJ	198000 J	176 J	UJ	UJ	UJ
Acrolein	20	20	R	R	R	UJ	UJ	UJ	R	UJ	UJ	UJ
Acrylonitrile	10	10	R	R	R	UJ	UJ	UJ	UJ	UJ	UJ	UJ
1,4-Dioxane	300	300	R	R	R	310 J	UJ	UJ	R	UJ	UJ	UJ
Ethyl cyanide	40	40	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Isobutyl alcohol	230	230	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Methacrylonitrile	110	110	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number			C-2R-5	C-2R-15	C-2R-40	FG-2GW	FG-5GW	FG-7GW	FG-8GW	GWFB-01	TB-91191	TB-91291
Sampling Depth (ft)			20-22'	30-32'	54-56'	9-11.5'	9-13'	9-12'	9-13'	NA	NA	NA
Laboratory Sample Number			HA6662	HA6663	HA6664	HA6533	HA6538	HA6536	HA6537	HA6583	HA6589	HA6590
Sampling Date	Quant	Quant	11/07/91	11/07/91	11/11/91	11/06/91	11/12/91	11/11/91	11/12/91	11/12/91	11/11/91	11/12/91
Dilution Factor	Limit	Limit	1.2	1.4	11.1	1.0	100	500	500	1.0	1.0	1.0
Units	ug/L	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
APPENDIX IX P/T VOLATILE COMPOUNDS												
Benzene	4.4	4.4	U	UJ	U	U	4260	2430	U	U	U	U
Methyl bromide	10	10	UJ	UJ	UJ	U	U	U	U	U	U	U
Carbon disulfide	10	10	U	UJ	U	U	U	U	U	U	U	U
Chloroethane	10	10	U	UJ	U	U	U	U	U	U	U	U
Chlorobenzene	6.0	6.0	U	UJ	U	1.6 J	963	U	U	U	U	U
2-Chloro-1,3-butadiene	-	-	U	NA	U	U	U	U	U	U	U	U
Chloroform	1.6	1.6	U	UJ	U	U	U	U	U	U	U	U
Methyl chloride	10	10	UJ	UJ	UJ	U	U	U	U	U	U	U
3-Chloropropene	10	10	U	UJ	U	R	R	R	R	R	R	R
1,2-Dibromo-3-chloropropane	10	10	U	NA	U	U	U	U	U	U	U	U
1,2-Dibromoethane	10	10	U	UJ	U	U	U	U	U	U	U	U
Dibromomethane	10	10	U	NA	U	U	U	U	U	U	U	U
1,4-Dichloro-2-butene	10	10	U	NA	U	U	U	U	U	U	U	U
Dichlorodifluoromethane	10	10	UJ	UJ	UJ	U	U	U	U	U	U	U
1,1-Dichloroethane	4.7	4.7	U	UJ	U	U	U	U	U	U	U	U
1,2-Dichloroethane	2.8	2.8	U	UJ	U	U	U	U	U	U	U	U
1,2-Dichloroethane (trans)	1.6	1.6	U	UJ	U	U	218	U	U	U	U	U
1,1-Dichloroethene	2.8	2.8	U	UJ	U	55.8	52300	74300	U	U	U	U
Methylene Chloride	2.8	2.8	UJ	UJ	84.5 J	248 B	15000 B	651000 B	1480 B	5.05 B	2.27 B	3.34 B
1,2-Dichloropropane	6.0	6.0	U	UJ	U	U	U	U	U	U	U	U
cis-1,3-Dichloropropene	5.0	5.0	U	UJ	U	U	U	U	U	U	U	U
trans-1,3-Dichloropropene	10	10	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Chlorodibromomethane	3.1	3.1	U	UJ	U	U	U	U	U	U	U	U
Dichlorobromomethane	2.2	2.2	U	UJ	U	U	U	U	U	U	U	U
Ethyl methacrylate	10	10	U	NA	U	U	U	U	U	U	U	U
Iodomethane	10	10	U	NA	U	U	U	U	U	U	U	U
Methyl ethyl ketone	10	10	R	R	R	R	R	R	R	R	R	R
Methyl methacrylate	10	10	U	UJ	U	U	U	U	U	U	U	U
Pentachloroethane	-	-	U	NA	U	U	U	U	U	U	U	U
1,1,1,2-Tetrachloroethane	10	10	U	UJ	U	U	U	U	U	U	U	U
1,1,2,2-Tetrachloroethane	4.1	4.1	U	UJ	U	U	U	U	U	U	U	U
Tetrachloroethene	4.1	4.1	U	UJ	38 J	U	U	U	U	U	U	U
Carbon Tetrachloride	2.8	2.8	U	UJ	U	U	U	U	U	U	U	U
Toluene	6.0	6.0	UJ	UJ	UJ	3.12 J	5570 J	UJ	UJ	UJ	UJ	UJ
Bromoform	4.7	4.7	U	UJ	U	U	U	U	U	U	U	U
1,1,1-Trichloroethane	3.8	3.8	U	UJ	U	U	U	U	U	U	U	U
1,1,2-Trichloroethane	5.0	5.0	U	UJ	U	U	1800	U	U	U	U	U

continued on next page (see last page for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO INCINERATOR FACILITY

Damez and Moore Sample Number			C-2R-5	C-2R-15	C-2R-40	FG-2GW	FG-5GW	FG-7GW	FG-8GW	GWFB-01	TB-91191	TB-91291
Sampling Depth (ft)			20-22'	30-32'	54-58'	9-11.5'	9-13'	9-12'	9-13'	NA	NA	NA
Laboratory Sample Number			HA6662	HA6663	HA6664	HA6533	HA6538	HA6536	HA6537	HA6583	HA6589	HA6590
Sampling Date			11/07/91	11/07/91	11/11/91	11/08/91	11/12/91	11/11/91	11/12/91	11/12/91	11/11/91	11/12/91
Dilution Factor			1.2	1.4	11.1	1.0	100	500	500	1.0	1.0	1.0
Units	Quant Limit ug/L	Quant Limit ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
APPENDIX IX P/T VOLATILE COMPOUNDS (continued)												
Trichloroethene	1.9	1.9	U	UJ	47.9	U	284	U	U	U	U	U
Trichlorofluoromethane	10	10	U	UJ	U	U	U	U	U	3.2 J	U	U
1,2,3-Trichloropropane	10	10	U	UJ	U	U	U	U	U	U	U	U
Vinyl Chloride	10	10	UJ	UJ	UJ	26.1 J	1410 J	6050 J	U	U	U	U
Acetone	10	10	UJ	461 J	UJ	91.0 J	R	16100 J	R	R	R	U
Ethylbenzene	7.2	7.2	UJ	UJ	UJ	R	158 J	R	R	R	R	U
2-Hexanone	10	10	U	UJ	U	U	U	U	U	U	U	U
Methyl isobutyl ketone	10	10	U	UJ	U	U	1460	U	U	U	U	U
Styrene	10	10	U	UJ	U	U	U	U	U	U	U	U
Vinyl acetate	10	10	U	UJ	U	U	U	U	U	U	U	U
m-Xylene	10	10	UJ	UJ	UJ	UJ	260 J	UJ	UJ	UJ	UJ	U
o,p-Xylenes	10	10	R	UJ	R	R	331 J	R	R	R	R	U

continued on next page (see last page for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number			C-2R-5 20-22' HA6662 11/07/91	C-2R-15 30-32' HA6663 11/07/91	C-2R-40 54-56' HA6664 11/11/91	FG-2GW 9-11.5' HA6533 11/06/91	FG-5GW 9-13' HA6536 11/12/91	FG-7GW 9-12' HA6536 11/11/91	FG-8GW 9-13' HA6537 11/12/91	GWFB-01 NA HA6583 11/12/91	TB-91191 NA HA6589 11/11/91	TB-91291 NA HA6590 11/12/91
Sampling Depth (ft)												
Laboratory Sample Number												
Sampling Date												
Dilution Factor												
Units	Quant Limit ug/L	Quant Limit ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
APPENDIX IX SEMIVOLATILE COMPOUNDS												
Acetophenone	10	1000	U	U	U	5.2 J	U	U	7.8 J	U	NA	NA
2-Acetylaminofluorene	10	1000	U	U	U	UJ	U	U	U	U	NA	NA
4-Aminobiophenyl	10	1000	U	U	U	UJ	U	U	U	U	NA	NA
Aniline	10	1000	U	U	U	R	UJ	U	78.3	U	NA	NA
Aramite	10	1000	U	U	U	UJ	U	U	U	U	NA	NA
Benzo(a)anthracene	8.0	790	U	U	U	8.0 J	U	UJ	U	U	NA	NA
Benzo(b)fluoranthene	4.9	490	U	U	U	11.1 J	U	UJ	U	U	NA	NA
Benzo(a)pyrene	2.6	250	U	U	U	U	U	U	U	U	NA	NA
Bis(2-Chloroethoxy)methane	5.5	540	U	U	U	UJ	U	U	U	U	NA	NA
Bis(2-chloroethyl) ether	5.9	580	U	U	U	UJ	UJ	U	U	U	NA	NA
Bis(2-chloroisopropyl) ether	5.9	580	U	U	U	UJ	UJ	U	U	U	NA	NA
Bis(2-Ethylhexyl)phthalate	10	1000	512 JB	512 JB	337 JB	UJ	U	UJ	38.0	U	NA	NA
4-Bromophenylphenyl ether	2.0	190	U	U	U	UJ	U	U	U	U	NA	NA
Butylbenzylphthalate	10	1000	U	U	U	UJ	UJ	UJ	UJ	UJ	NA	NA
2-sec-Butyl-4,6-dinitrophen	10	1000	U	U	U	UJ	U	U	U	U	NA	NA
p-Chloraniline	10	1000	UJ	UJ	UJ	R	533 J	U	21.2 J	UJ	NA	NA
p-Chloro-m-cresol	3.1	300	U	U	U	U	R	R	R	U	NA	NA
2-Chloranaphthalene	2.0	190	U	U	U	UJ	U	U	U	U	NA	NA
2-Chlorophenol	3.4	330	R	R	R	UJ	469 J	R	39.3	UJ	NA	NA
Chrysene	2.6	250	U	U	U	9.19 J	U	UJ	U	U	NA	NA
Acenaphthene	2.0	190	U	U	U	4.44 J	U	U	5.08	U	NA	NA
Acenaphthylene	3.6	350	U	U	U	UJ	U	U	U	U	NA	NA
Anthracene	2.0	190	U	U	U	3.07 J	U	U	U	U	NA	NA
Benzo(ghi)perylene	3.2	415	U	U	U	UJ	U	UJ	U	U	NA	NA
Benzo(k)fluoranthene	2.6	250	U	U	U	UJ	U	UJ	U	U	NA	NA
Fluorene	2.0	190	U	U	U	4.83 J	U	U	1.4 J	U	NA	NA
Phenanthrene	5.6	550	155 J	272 J	264 J	24.6 J	U	U	2.8 J	U	NA	NA
Pyrene	2.0	190	U	U	U	11.9 J	U	UJ	2.55	U	NA	NA
2-Nitrophenol	3.7	365	U	U	U	U	R	R	U	U	NA	NA
o-Cresol	10	1000	U	U	U	U	37.1 J	U	R	U	NA	NA
m+p-Cresols	10	1000	U	U	U	U	3400 J	195 J	123 J	U	NA	NA
Diallate	10	1000	U	U	U	UJ	U	U	U	U	NA	NA
Dibenzo(a,h)anthracene	2.6	250	U	U	U	UJ	U	UJ	U	U	NA	NA
Di-N-butyl phthalate	10	1000	4300 B	2670 B	5810 B	UJ	3.4 J	UJ	UJ	UJ	NA	NA
1,2-Dichlorobenzene	2.0	190	U	U	U	UJ	UJ	U	U	U	NA	NA
1,3-Dichlorobenzene	2.0	190	U	U	U	UJ	UJ	U	U	U	NA	NA
1,4-Dichlorobenzene	4.5	450	U	U	U	UJ	UJ	U	U	U	NA	NA
3,3-Dichlorobenzidine	17	1675	U	U	U	R	U	UJ	U	U	NA	NA
2,4-Dichlorophenol	2.8	275	U	U	U	73.9	3430 J	R	R	U	NA	NA
2,6-Dichlorophenol	10	1000	U	U	U	18.8	527 J	U	4.4 J	U	NA	NA

continued next page (see last page of table for notes)

**TABLE 2**  
**SUMMARY OF ANALYTICAL RESULTS**  
**PHASE II INVESTIGATION**  
**CHEMICAL WASTE MANAGEMENT**  
**CHICAGO, ILLINOIS**

Dames and Moore Sample Number			C-2R-5	C-2R-15	C-2R-40	FG-2GW	FG-5GW	FG-7GW	FG-8GW	GWFB-01	TB-91191	TB-91291
Sampling Depth (ft)			20-22'	30-32'	54-56'	9-11.5'	9-13'	9-12'	9-13'	NA	NA	NA
Laboratory Sample Number			HA6662	HA6663	HA6664	HA6533	HA6538	HA6536	HA6537	HA6583	HA6589	HA6590
Sampling Date	Quant	Quant	11/07/91	11/07/91	11/11/91	11/08/91	11/12/91	11/11/91	11/12/91	11/12/91	11/11/91	11/12/91
Dilution Factor	Limit	Limit	1.2	1.4	11.1	1.0	1.0	19	1.0	1.0	1.0	1.0
Units	ug/L	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
APPENDIX IX SEMIVOLATILE COMPOUNDS (continued)												
Diethylphthalate	10	1000	U	U	U	R	R	R	R	R	NA	NA
p-Dimethylaminoazobenzene	10	1000	U	U	U	UJ	U	UJ	U	U	NA	NA
7,12-Dimethylbenzo(a)anthra	10	1000	U	U	U	UJ	U	UJ	U	U	NA	NA
3,3-Dimethylbenzidine	10	1000	U	U	U	R	U	R	U	U	NA	NA
a-a-Dimethylphenethylamine	-	-	-	-	-	-	NA	NA	NA	-	NA	NA
2,4-Dimethylphenol	2.8	275	U	U	U	U	57.0 J	U	5.96 J	U	NA	NA
Dimethyl phthalate	10	1000	U	U	U	R	U	R	U	U	NA	NA
m-Dinitrobenzene	10	1000	U	U	U	UJ	U	U	U	U	NA	NA
4,6-Dinitro-0-cresol	25	2400	U	U	U	U	R	R	R	U	NA	NA
2,4-Dinitrophenol	43	4250	U	U	U	U	R	R	R	U	NA	NA
2,4-Dinitrotoluene	5.9	580	U	U	U	UJ	U	U	U	U	NA	NA
2,6-Dinitrotoluene	2.0	190	U	U	U	UJ	U	U	U	U	NA	NA
Di-n-octyl phthalate	10	1000	U	U	U	UJ	U	UJ	U	U	NA	NA
Diphenylamine	10	1000	U	U	U	UJ	U	U	U	U	NA	NA
N-nitrosodipropylamine	10	1000	U	U	UJ	UJ	UJ	UJ	U	U	NA	NA
Ethyl methanesulfonate	10	1000	U	U	U	UJ	UJ	U	U	U	NA	NA
Fluoranthene	2.3	225	U	U	U	15.3 J	U	U	2.5 J	U	NA	NA
Hexachlorobenzene	2.0	190	U	U	U	UJ	U	U	U	U	NA	NA
Hexachlorobutadiene	0.93	90	U	U	U	UJ	U	U	U	U	NA	NA
Hexachlorocyclopentadiene	10	1000	U	U	U	UJ	U	U	U	U	NA	NA
Hexachloroethane	1.6	165	U	U	U	UJ	UJ	U	U	U	NA	NA
Isodrin	6.1	1000	U	U	U	UJ	U	U	U	U	NA	NA
Hexachlorophene	10	1000	U	U	U	UJ	U	UJ	U	U	NA	NA
Hexachloropropene	10	1000	U	U	U	UJ	U	U	U	U	NA	NA
Indeno(1,2,3-c,d)pyrene	3.8	365	U	U	U	UJ	U	UJ	U	U	NA	NA
Isosafrole	10	600	U	U	U	UJ	U	U	U	U	NA	NA
Methapyrene	-	-	IND	IND	IND	IND	IND	IND	IND	IND	NA	NA
3-Methylcholanthrene	5.7	555	U	U	U	UJ	U	UJ	U	U	NA	NA
Methyl methanesulfonate	10	1000	U	U	U	UJ	UJ	U	U	U	NA	NA
Naphthalene	1.6	165	U	U	U	25.6 J	U	112	9.92	U	NA	NA
1,4-Naphthoquinone	10	1000	U	U	U	UJ	R	U	R	U	NA	NA
1-Naphthylamine	10	1000	U	U	U	UJ	U	U	U	U	NA	NA
2-Naphthylamine	10	1000	U	U	U	UJ	U	U	U	U	NA	NA
p-Nitroaniline	10	1000	U	U	U	UJ	U	U	U	U	NA	NA
Nitrobenzene	2.0	190	U	U	U	UJ	U	U	U	U	NA	NA
4-Nitrophenol	2.5	240	U	U	U	R	R	R	R	UJ	NA	NA
4-Nitroquinoline-N-oxide	-	-	IND	IND	IND	IND	IND	IND	IND	IND	NA	NA
N-Nitrosodiphenylamine	2.0	190	U	U	U	UJ	U	U	U	U	NA	NA
N-Nitrosodi-n-butylamine	10	1000	U	U	U	UJ	U	U	U	U	NA	NA
N-Nitrosodiethylamine	10	1000	U	U	U	UJ	U	U	U	U	NA	NA
N-Nitrosodimethylamine	10	1000	U	U	U	UJ	UJ	U	U	U	NA	NA
N-Nitrosomethylethylamine	10	1000	U	U	U	UJ	U	U	U	U	NA	NA

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number			C-2R-5	C-2R-15	C-2R-40	FG-2GW	FG-5GW	FG-7GW	FG-8GW	GWFB-01	TB-01191	TB-01291
Sampling Depth (ft)			20-22'	30-32'	54-56'	9-11.5'	9-13'	9-12'	9-13'	NA	NA	NA
Laboratory Sample Number			HA6662	HA6663	HA6664	HA6533	HA6538	HA6536	HA6537	HA6583	HA6589	HA6590
Sampling Date	Quant	Quant	11/07/91	11/07/91	11/11/91	11/06/91	11/12/91	11/11/91	11/12/91	11/12/91	11/11/91	11/12/91
Dilution Factor	Limit	Limit	1.2	1.4	11.1	1.0	1.0	19	1.0	1.0	1.0	1.0
Units	ug/L	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
APPENDIX IX SEMIVOLATILE COMPOUNDS (continued)												
N-Nitrosomorpholine	10	1000	U	U	U	UJ	U	U	U	U	NA	NA
N-Nitrosopiperidine	10	1000	U	U	U	UJ	U	U	U	U	NA	NA
N-Nitrosopyrrolidine	10	1000	U	U	U	UJ	U	U	U	U	NA	NA
5-Nitro-o-toluidine	10	1000	U	U	U	UJ	U	U	U	U	NA	NA
Pentachlorobenzene	10	1000	U	U	U	UJ	U	U	U	U	NA	NA
Pentachloronitrobenzene	10	1000	U	U	U	UJ	U	U	U	U	NA	NA
Pentachlorophenol	3.7	365	U	U	U	UJ	260 J	R	R	U	NA	NA
Phenacetin	10	1000	U	U	U	UJ	U	U	U	U	NA	NA
Phenol	1.5	150	U	U	U	126 J	7510 J	19900 J	668 J	U J	NA	NA
m-phenylenediamine	10	1000	U	U	U	UJ	U	U	U	U	NA	NA
o-phenylenediamine	10	1000	U	U	U	UJ	U	U	U	U	NA	NA
p-phenylenediamine	10	1000	U	U	U	UJ	U	U	U	U	NA	NA
2-Picoline	10	1000	U	U	U	UJ	UJ	U	U	U	NA	NA
Pronamide	10	1000	U	U	U	UJ	U	U	U	U	NA	NA
Pyridine	10	1000	U	U	U	UJ	3470	9300	49.9	U	NA	NA
Safrrole	10	1000	U	U	U	UJ	U	U	U	U	NA	NA
1,2,4,5-Tetrachlorobenzene	10	1000	U	U	U	UJ	U	U	U	U	NA	NA
2,3,4,6-Tetrachlorophenol	10	1000	U	U	U	U	19.3 J	U	R	U	NA	NA
Tetraethyldithiopyrophospha	-	-	U	U	U	UJ	U	U	U	U	NA	NA
o-Toluidine	10	1000	U	U	U	UJ	U	U	33.1	U	NA	NA
1,2,4-Trichlorobenzene	2.0	190	U	U	U	UJ	U	U	U	U	NA	NA
2,4,5-Trichlorophenol	10	1000	U	U	U	U	R	R	R	U	NA	NA
2,4,6-Trichlorophenol	2.8	275	U	U	U	U	62.7 J	R	R	U	NA	NA
0,0,0-Triethyl phosphorothi	-	-	-	-	-	-	NA	NA	NA	NA	NA	NA
sym-Trinitrobenzene	-	-	IND	IND	IND	IND	INDJ	IND	IND	IND	NA	NA
Benzyl alcohol	10	1000	U	U	U	UJ	UJ	180 J	U	U	NA	NA
Dibenzofuran	10	1000	U	U	U	3.5 J	U	U	U	U	NA	NA
Isophorone	2.3	225	U	U	U	UJ	U	U	U	U	NA	NA
2-Methylnaphthalene	10	1000	U	U	143 J	10.6 J	3.7 J	U	1.4 J	U	NA	NA
o-Nitroaniline	10	1000	U	U	U	UJ	U	U	U	U	NA	NA
m-Nitroaniline	10	1000	U	U	U	UJ	UJ	U	UJ	UJ	NA	NA
4-Chlorophenyl phenyl ether	4.3	425	U	U	U	UJ	U	U	U	U	NA	NA

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number			C-2R-5	C-2R-15	C-2R-40	FG-2GW	FG-5GW	FG-7GW	FG-8GW	GWFB-01	TB-91191	TB-91291
Sampling Depth (ft)			20-22'	30-32'	54-56'	9-11.5'	9-13'	9-12'	9-13'	NA	NA	NA
Laboratory Sample Number			HA6662	HA6663	HA6664	HA6533	HA6538	HA6536	HA6537	HA6583	HA6589	HA6590
Sampling Date			11/07/91	11/07/91	11/11/91	11/06/91	11/12/91	11/11/91	11/12/91	11/12/91	11/11/91	11/12/91
Units	Quant Limit ug/L	Quant Limit ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
<b>INORGANIC PARAMETERS (METALS)</b>												
Antimony	60	6000	BMDL J	U	U	U	U	U	U	U	NA	NA
Arsenic	100	1000	5800	13000	11000	BMDL J	46	43	43	UJ	NA	NA
Barium	20	2000	46000	14000	15000	92	77	390	92	U	NA	NA
Beryllium	1.0	100	690	350	460	BMDL J	BMDL J	1.4	U	U	NA	NA
Cadmium	3.0	200	2800	2900	7100	U	U	U	U	U	NA	NA
Chromium	10	1000	18000	7700	10000	U	12	BMDL J	U	U	NA	NA
Cobalt	20	2000	11000	11000	16000	U	U	U	U	U	NA	NA
Copper	10	1000	23000	37000	36000	11	BMDL J	22	U	U	NA	NA
Lead	5.0	500	14000 J	21000 J	49000 J	U	U	BMDL J	BMDL J	U	NA	NA
Mercury	0.20	80	U	U	BMDL J	U	U	U	U	U	NA	NA
Nickel	20	1000	28000	23000	41000	33	92	56	55	U	NA	NA
Selenium	5.0	500	BMDL J	U	U	5.0	29	BMDL J	BMDL J	UJ	NA	NA
Silver	10	1000	BMDL J	BMDL J	BMDL J	U	U	BMDL J	U	U	NA	NA
Thallium	10	1000	BMDL J	BMDL J	BMDL J	UJ	UJ	UJ	UJ	U	NA	NA
Tin	50	5000	31000	26000	35000	BMDL J	U	60	BMDL J	U	NA	NA
Vanadium	20	2000	23000	12000	17000	U	200	27	32	U	NA	NA
Zinc	20	2000	46000	53000	53000	U	U	U	BMDL J	U	NA	NA

continued next page (see last page of table for notes)



TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number			B S-6	B S-8	SEDDUP01	SW-6	SW-8	SW-11	SW-12	SW-13	SWDUP01	SW-14	TB-110891
Laboratory Sample Number			HA6672	HA6681	HA6682	HA6705	HA6702	HA6701	HA6704	HA6699	HA6697	HA6698	HA6708
Sampling Date	Quant	Quant	11/08/91	11/08/91	11/08/91	11/08/91	11/08/91	11/08/91	11/08/91	11/08/91	11/08/91	11/08/91	11/08/91
Dilution Factor	Limit	Limit	1.4	1.2	1.2	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Units	ug/L	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
PRIORITY POLLUTANT P/T VOLATILE COMPOUNDS													
Benzene	4.4	4.4	U	U	U	NA	U	U	U	U	U	U	UJ
Bromoform	4.7	4.7	U	U	U	NA	U	U	U	U	U	U	UJ
Carbon Tetrachloride	2.8	2.8	U	U	U	NA	U	U	U	U	U	U	UJ
Chlorobenzene	6.0	6.0	U	U	U	NA	U	U	U	U	U	U	UJ
Chlorodibromomethane	3.1	3.1	U	U	U	NA	U	U	U	U	U	U	UJ
Chloroethane	10	10	U	U	U	NA	U	U	U	U	U	U	UJ
2-Chloroethyl vinyl ether	10	10	U	U	U	NA	U	U	U	U	U	U	UJ
Chloroform	1.6	1.6	U	U	U	NA	U	U	U	U	U	U	UJ
Dichlorobromomethane	2.2	2.2	U	U	U	NA	U	U	U	U	U	U	UJ
Dichlorodifluoromethane	10	10	UJ	U	UJ	NA	U	U	U	U	U	U	UJ
1,1-Dichloroethane	4.7	4.7	U	U	U	NA	U	U	U	U	U	U	UJ
1,2-Dichloroethane	2.8	2.8	U	U	U	NA	U	U	U	U	U	U	UJ
1,1-Dichloroethene	2.8	2.8	U	U	U	NA	U	U	U	U	U	U	UJ
1,2-Dichloropropane	6.0	6.0	U	U	U	NA	U	U	U	U	U	U	UJ
cis-1,3-Dichloropropene	5.0	5.0	U	U	U	NA	U	U	U	U	U	U	UJ
trans-1,3-Dichloropropene	10	10	UJ	UJ	UJ	NA	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Ethylbenzene	7.2	7.2	UJ	UJ	UJ	NA	U	U	U	U	U	U	UJ
Methyl bromide	10	10	UJ	U	UJ	NA	U	U	U	U	U	U	UJ
Methyl chloride	10	10	UJ	U	UJ	NA	UJ	U	U	U	U	U	UJ
Methylene Chloride	2.8	2.8	UJ	U	UJ	NA	2.17 JB	2.54 JB	U	2.33 JB	2.74 JB	U	UJ
1,1,2,2-Tetrachloroethane	4.1	4.1	U	U	U	NA	U	U	U	U	U	U	UJ
Tetrachloroethene	4.1	4.1	U	U	U	NA	U	U	U	U	U	U	UJ
Toluene	6.0	6.0	UJ	UJ	UJ	NA	UJ	1.26 J	UJ	UJ	UJ	4.11 J	UJ
1,2-Dichloroethene (trans)	1.6	1.6	U	U	U	NA	U	U	U	U	U	U	UJ
1,1,1-Trichloroethane	3.8	3.8	U	U	U	NA	U	U	U	U	U	U	UJ
1,1,2-Trichloroethane	5.0	5.0	U	U	U	NA	U	U	U	U	U	U	UJ
Trichloroethene	1.9	1.9	U	U	U	NA	U	U	U	U	U	U	UJ
Trichlorofluoromethane	10	10	U	U	U	NA	U	U	U	U	U	U	UJ
Vinyl Chloride	10	10	UJ	U	UJ	NA	U	U	U	U	U	U	UJ

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number			B S-6	B S-8	SEDDUP01	SW-6	SW-8	SW-11	SW-12	SW-13	SWDUP01	SW-14	TB-110891
Laboratory Sample Number			HA6672	HA6681	HA6682	HA6705	HA6702	HA6701	HA6704	HA6699	HA6697	HA6698	HA6708
Sampling Date	Quant	Quant	11/08/91	11/08/91	11/08/91	11/08/91	11/08/91	11/08/91	11/08/91	11/08/91	11/08/91	11/08/91	11/08/91
Dilution Factor	Limit	Limit	14	11	12	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Units	ug/L	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
ACID EXTRACTABLE COMPOUNDS													
2-Chlorophenol	3.9	340	R	R	R	R	R	R	R	R	R	R	NA
2,4-Dichlorophenol	3.2	280	U	U	U	R	R	R	R	R	R	R	NA
2,4-Dimethylphenol	3.2	280	U	U	U	R	R	R	R	R	R	R	NA
4,6-Dinitro-2-methylphenol	29	2400	U	U	U	R	R	R	R	R	R	R	NA
2,4-Dinitrophenol	50	4300	U	U	U	R	R	R	R	R	R	R	NA
2-Nitrophenol	4.3	370	U	U	U	R	R	R	R	R	R	R	NA
4-Nitrophenol	2.9	240	U	U	U	R	R	R	R	R	R	R	NA
4-Chloro-3-methylphenol	3.6	310	U	U	U	R	R	R	R	R	R	R	NA
Pentachlorophenol	4.3	370	U	U	U	R	R	R	R	R	R	R	NA
Phenol	1.8	150	U	U	U	R	R	R	R	R	R	R	NA
2,4,6-Trichlorophenol	3.2	280	U	U	U	R	R	R	R	R	R	R	NA

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number			B S-6	B S-8	SEDDUP01	SW-6	SW-8	SW-11	SW-12	SW-13	SWDUP01	SW-14	TB-110891
Laboratory Sample Number			HA6672	HA6681	HA6682	HA6705	HA6702	HA6701	HA6704	HA6699	HA6697	HA6698	HA6708
Sampling Date	Quant	Quant	11/08/91	11/08/91	11/08/91	11/08/91	11/08/91	11/08/91	11/08/91	11/08/91	11/08/91	11/08/91	11/08/91
Dilution Factor	Limit	Limit	14	11	12	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Units	ug/L	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
BASE/NEUTRAL EXTRACTABLE COMPOUNDS													
Acenaphthene	2.3	220	U	U	U	R	R	U	U	U	U	U	NA
Acenaphthylene	4.2	410	U	U	U	R	R	U	U	U	U	U	NA
Anthracene	2.3	220	U	UJ	1820 J	R	R	U	U	U	U	U	NA
Benzo(a)anthracene	9.3	910	U	UJ	4450 J	R	R	UJ	U	U	UJ	UJ	NA
Benzo(a)pyrene	3.0	290	U	UJ	3300 J	R	R	UJ	U	U	UJ	UJ	NA
Benzo(b)fluoranthene	5.7	560	U	UJ	3100 J	R	R	UJ	U	U	UJ	UJ	NA
Benzo(g,h,i)perylene	4.9	480	U	UJ	U	R	R	UJ	U	U	UJ	UJ	NA
Benzo(k)fluoranthene	3.0	290	U	UJ	U	R	R	UJ	U	U	UJ	UJ	NA
bis(2-Chloroethoxy)methane	6.3	620	U	U	U	R	R	U	U	U	U	U	NA
Bis(2-chloroethyl) ether	6.8	660	U	U	U	R	R	U	U	U	U	U	NA
bis(2-chloroisopropyl)ether	6.8	660	U	U	U	R	R	U	U	U	U	U	NA
bis(2-Ethylhexyl)phthalate	12	1200	U	U	U	R	R	UJ	U	U	UJ	UJ	NA
4-Bromophenylphenyl ether	2.3	220	U	U	U	R	R	U	U	U	U	U	NA
Butylbenzylphthalate	12	1200	U	U	U	R	R	UJ	U	U	UJ	UJ	NA
2-Chloronaphthalene	2.3	220	U	U	U	R	R	U	U	U	U	U	NA
4-Chlorophenylphenyl ether	5.0	490	U	U	U	R	R	U	U	U	U	U	NA
Chrysene	3.0	290	U	UJ	4070 J	R	R	UJ	U	U	UJ	UJ	NA
Dibenz(a,h)anthracene	3.0	290	U	UJ	U	R	R	UJ	U	U	UJ	UJ	NA
1,2-Dichlorobenzene	2.3	220	U	U	U	R	R	U	U	U	U	U	NA
1,3-Dichlorobenzene	2.3	220	U	U	U	R	R	U	U	U	U	U	NA
1,4-Dichlorobenzene	5.2	510	U	U	U	R	R	U	U	U	U	U	NA
3,3'-Dichlorobenzidine	19.6	1920	U	U	U	R	R	UJ	UJ	UJ	UJ	UJ	NA
Diethylphthalate	12	1200	U	U	U	R	R	R	R	R	R	R	NA
Dimethylphthalate	12	1200	U	U	U	R	R	R	R	R	R	R	NA
Di-n-butylphthalate	12	1200	17900 B	11500 JB	6000 JB	R	R	UJ	UJ	UJ	UJ	UJ	NA
2,4-Dinitrotoluene	6.8	660	U	U	U	R	R	U	U	U	U	U	NA
2,6-Dinitrotoluene	2.3	220	U	U	U	R	R	U	U	U	U	U	NA
Di-n-octylphthalate	12	1200	U	UJ	U	R	R	UJ	U	U	UJ	UJ	NA
Fluoranthene	2.6	260	3390	UJ	9690 J	R	R	U	U	U	U	U	NA
Fluorene	2.3	220	U	U	U	R	R	U	U	U	U	U	NA
Hexachlorobenzene	2.3	220	U	U	U	R	R	U	U	U	U	U	NA
Hexachlorobutadiene	1.1	100	U	U	U	R	R	U	U	U	U	U	NA
Hexachlorocyclopentadiene	12	1200	U	U	U	R	R	U	U	U	U	U	NA
Hexachloroethane	1.9	190	U	U	U	R	R	U	U	U	U	U	NA
Indeno(1,2,3-cd)pyrene	4.4	430	U	UJ	U	R	R	UJ	U	U	UJ	UJ	NA
Isophorone	2.6	260	U	U	U	R	R	U	U	U	U	U	NA
Naphthalene	1.9	190	U	U	1700 J	R	R	U	U	U	U	U	NA
Nitrobenzene	2.3	220	U	U	U	R	R	U	U	U	U	U	NA
N-Nitroso-dimethylamine	12	1200	U	U	U	R	R	U	U	U	U	U	NA
N-Nitroso-di-n-propylamine	12	1200	U	U	U	R	R	UJ	UJ	UJ	UJ	UJ	NA
N-Nitroso-diphenylamine	2.3	220	U	U	U	R	R	U	U	U	U	U	NA
Phenanthrene	6.4	630	4440 J	1500 J	10800 J	R	R	U	U	U	U	U	NA
Pyrene	2.3	220	3300	UJ	8690 J	R	R	UJ	U	U	UJ	UJ	NA
1,2,4-Trichlorobenzene	2.3	220	U	U	U	R	R	U	U	U	U	U	NA

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number			B S-6	B S-8	SEDDUP01	SW-6	SW-8	SW-11	SW-12	SW-13	SWDUP01	SW-14	TB-110891
Laboratory Sample Number			HA6672	HA6681	HA6682	HA6705	HA6702	HA6701	HA6704	HA6699	HA6697	HA6698	HA6708
Sampling Date	Quant	Quant	11/08/91	11/08/91	11/08/91	11/08/91	11/08/91	11/08/91	11/08/91	11/08/91	11/08/91	11/08/91	11/08/91
Units	ug/L	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
<b>INORGANIC PARAMETERS (METALS)</b>													
Antimony	60	6000	U	BMDL J	U	U	U	U	U	U	U	U	NA
Arsenic	100	1000	6500	7900	9300	U	U	U	U	U	U	U	NA
Beryllium	1.0	100	930	470	1000	U	U	U	U	U	U	U	NA
Cadmium	2.0	200	4100	2100	2200	U	U	U	U	U	U	U	NA
Chromium	10	1000	25000	139000	11000 J	U	U	U	U	U	U	U	NA
Copper	10	1000	30000	12000	12000	U	U	U	U	U	U	U	NA
Lead	5.0	500	86000	41000 J	17000 J	U	U	U	U	U	U	U	NA
Mercury	0.20	80	BMDL	BMDL J	U	U	U	U	U	U	U	U	NA
Nickel	20	1000	16000	5000 J	10000 J	U	U	U	U	U	U	U	NA
Selenium	5.0	500	UJ	U	U	BMDL J	U	BMDL J	BMDL J	UJ	UJ	BMDL J	NA
Silver	10	1000	BMDL J	BMDL J	BMDL J	U	U	U	U	U	U	U	NA
Thallium	10	1000	U	U	U	U	UJ	U	U	UJ	UJ	UJ	NA
Zinc	20	2000	120000 J	35000	48000	U	U	U	U	U	U	U	NA

**LEGEND:**

- U Compound was not detected at laboratory method detection limit
  - J Estimated value due to limitations identified during the quality assurance review.
  - UJ eported method detection limit is estimated due to limitations identified during the quality assurance review.
  - B Compound was detected in a laboratory and/or field blank at similar concentrations. May represent laboratory and/or field contamination.
  - R Unreliable result. Compound may or may not be present.
  - \* Sample analyzed at multiple dilutions. Summary table is a hybrid of diluted and undiluted results.
  - No standard available. Compound was qualitatively searched for.
  - IND Indeterminate. Standard and/or spikes could not be detected at method detection limit.
  - BMDL Below Method Detection Limit reported by laboratory.
- Discrepancies may exist between the laboratory data tables and the data validation summary tables due to variations in the rounding of calculations.



**DATA VALIDATION/QUALITY ASSURANCE REVIEW  
PHASE II RCRA FACILITY INVESTIGATION  
CHEM WASTE MANAGEMENT, INC. - CHICAGO INCINERATOR  
SAMPLE COLLECTION DATES: NOVEMBER 13 - NOVEMBER 15, 1993  
DAMES & MOORE JOB NO.: 13963-055-192**

**LABORATORY REPORT Nos.: 101421, 101424 & 101425**

**INTRODUCTION**

Eight (8) sediment samples, ten (10) surface water samples, two (2) groundwater samples, two (2) field-blank samples and three (3) trip-blank samples were collected and submitted to Environmental Testing Corporation (ETC) of Edison, New Jersey (1992 Illinois Certification No. 100224). All samples included in the review are listed on Table 1. All sediment samples, eight (8) surface water samples and the field-blank samples were analyzed for priority pollutant volatile organic compounds, semivolatile organic compounds (base/neutral organic and acid-extractable organic compounds) and metals. One (1) surface water sample was analyzed for priority pollutant volatile organic compounds and semivolatile organic compounds only. All trip-blank samples and one (1) surface water sample were analyzed for priority pollutant volatile organic compounds only. The groundwater samples were analyzed for RCRA Appendix IX heated purge and trap (HP/T) volatile organic compounds, purge and trap (P/T) volatile organic compounds, semivolatile organic compounds and metals. All samples were analyzed following USEPA SW-846 Methodologies.

A data validation review was performed on all samples prepared under a modified CLP-SOW 3/90 CLP-I data deliverable format. Data were examined to assess the usability of the results, as well as to assess the compliance relative to data package deliverable requirements. The organic data review is based upon a rigorous review of the reported hold times, surrogate recoveries, blank spike recoveries, matrix spike and matrix spike duplicate summaries, blank contaminants, internal standard area performance, Gas Chromatography/Mass Spectroscopy (GC/MS) tuning and calibration data.

The inorganic data review is based on a review of the reported hold times, blank analysis results, blank spike recoveries, matrix spike and duplicate results, calibration results, post-digestion spike recoveries and Inductively Coupled Plasma (ICP) serial dilution analysis.

The data validation/quality assurance review is presented in the narrative section of the report. The data is summarized on Table 2. Data qualifiers have been placed next to the results so that the data user can quickly assess the qualitative and/or quantitative reliability of the reported result. This report was prepared to provide a critical review of the laboratory analysis and reported chemical results. Quality

assurance reviews of laboratory-generated data routinely identify problems associated with analytical measurements, even from the most experienced and capable laboratories.

This review has been performed in accordance with the requirements specified in the "Laboratory Data Validation Functional Guidelines for Evaluating Organic Analyses" dated February 1988 and "Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses" dated July 1988.

**TABLE 1**  
**SAMPLES INCLUDED IN REVIEW**

<u>Sample ID</u>	<u>Lab ID</u>	<u>Date Collected</u>	<u>Test Requested</u>
<u>Log Link No. 101421</u>			
S-7	HA6673	11/13/91	PP VOA, PP BNA & PP Metals
S-9	HA6674	11/13/91	PP VOA, PP BNA & PP Metals
S-1	HA6678	11/13/91	PP VOA, PP BNA & PP Metals
S-10	HA6679	11/13/91	PP VOA, PP BNA & PP Metals
SW-7	HA6694	11/13/91	PP VOA, PP BNA & PP Metals
SW-9	HA6695	11/13/91	PP VOA, PP BNA & PP Metals
SW-10	HA6696	11/13/91	PP VOA, PP BNA & PP Metals
SW-1	HA6700	11/13/91	PP VOA & PP BNA
TB-111391	HA6707	11/13/91	PP VOA
<u>Log Link No. 101424</u>			
FG-3GW	HA6535	11/12/91	RCRA Appendix IX HP/T VOA, P/T VOA, BNA & Metals
S-5	HA6675	11/14/91	PP VOA, PP BNA & PP Metals
S-4	HA6676	11/14/91	PP VOA, PP BNA & PP Metals
S-3	HA6677	11/14/91	PP VOA, PP BNA & PP Metals
SEDFB111491	HA6683	11/14/91	PP VOA, PP BNA & PP Metals
SW-5	HA6690	11/14/91	PP VOA, PP BNA & PP Metals
SW-4	HA6691	11/14/91	PP VOA, PP BNA & PP Metals
SW-3	HA6703	11/14/91	PP VOA, PP BNA & PP Metals
SWFB111491	HA6706	11/14/91	PP VOA, PP BNA & PP Metals
TB-111491	HA6709	11/14/91	PP VOA
<u>Log Link 101425</u>			
FG-4GW	HA6539	11/14/91	RCRA Appendix IX HP/T VOA, P/T VOA, BNA & Metals
S-2	HA6680	11/15/91	PP VOA, PP BNA & PP Metals
TB-111591	HA6884	11/15/91	RCRA Appendix IX P/T VOA
SW-2	HA6692	11/15/91	PP VOA, PP BNA & PP Metals
SW-15	HA6693	11/15/91	PP VOA, PP BNA & PP Metals
SW-6	HA6760	11/15/91	PP VOA

Legend:

PP VOA	=	Priority Pollutant Volatile Organic Compounds
PP BNA	=	Priority Pollutant Semivolatile Organic Compounds (Base/Neutral and Acid Extractable Organic Compounds)
PP Metals	=	Priority Pollutant Metals
HP/T VOA	=	RCRA Appendix IX Heated Purge and Trap Volatile Organic Compounds
P/T VOA	=	RCRA Appendix IX Purge and Trap Volatile Organic Compounds
BNA	=	RCRA Appendix IX Semivolatile Organic Compounds

GENERAL COMMENTS

With regard to the data package deliverables, most of the requirements were met with the exception of the following anomalies noted during data validation/quality assurance review. Please note that these do not impact the data usability.

- In the metals fraction, this reviewer has observed that for the ICP concentrations reported at 10 to 15 times above the method detection limit (MDL), the data validation cannot reproduce the laboratory reported results. The calculation obtained during data validation is consistently higher than the laboratory reported concentration. This is due to the fact that the interelement correction factors in the ICP instrument have been externally calculated in the system. Since this external interelement correction factor is not available for review, the reported results for low level samples cannot be reproduced. It should be noted that positive ICP reported results that are significantly above than the MDL (approximately 100 times higher or more) were reproduced and validated, since this interelement correction factor becomes negligible at higher concentrations. It is this reviewer's opinion that data usability is not impacted. The data review assumes that the low level reported concentrations (10 to 15 times the MDL) are correct as reported and it is this reviewer's opinion that data usability is not impacted.
- In the priority pollutant semivolatile analysis, all sediment samples (S-7, S-9, S-1, S-10, S-5, S-4, S-3, and S-2) were analyzed at 1:10 dilutions with the majority of all target compounds reported as below the method detection limit (BMDL). Good laboratory practice calls for reanalysis when all target compound concentrations in a dilution run are reported as BMDL.
- The groundwater sample, FG-3GW, was reanalyzed for heated purge and trap (HP/T) volatile organics at 1:10 dilution due to 1,4-dioxane target compound concentration exceeding the linear calibration range requirements. The 1,4-dioxane result for this sample was reported from this



1:10 dilution; however, the laboratory did not provide the GC/MS tune and calibration data associated with this dilution analysis. Therefore, no comments can be offered regarding the compound compliance criteria associated with the 1,4-dioxane reanalysis of this sample.

- The groundwater samples FG-3GW and FG-4GW were reanalyzed at higher dilutions for semivolatiles due to target compound concentrations exceeding the linear calibration range requirements. The results of these samples are a hybrid of both initial and dilution analyses; however, the laboratory did not provide the GC/MS tune and calibration data associated with the dilution analyses. No comments can be offered regarding the compound compliance criteria associated with the compounds quantitated from the dilution analyses.

### DATA QUALIFIERS

Overall, the data quality is good. The data validation review has identified aspects of the analytical data that require qualification. To confidently use any of the data within the data set, the data user should understand the limitations and qualifications presented. With regard to data usability, the following qualifiers are offered based upon the data provided.

### ORGANIC QUALIFIERS

#### Hold Times:

- The groundwater sample FG-3GW was initially analyzed within the hold time requirement for the HP/T volatile organics. Due to the high concentration of 1,4-dioxane, a 1:10 dilution reanalysis was performed; however, the reanalysis was performed 6 days outside the hold time criteria. The 1,4-dioxane concentration was reported from this dilution reanalysis. Since the concentration of 1,4-dioxane in the 1:10 dilution is comparably similar to the concentration of the initial undiluted analysis, it is this reviewer's opinion that no qualifier should apply to this compound based on the hold time exceedence.

#### Blank Contamination:

- Due to the presence of methacrylonitrile in the HP/T volatile laboratory blank associated with the groundwater sample FG-4GW, the positive result of this compound in the sample is qualitatively questionable and have been flagged (B) on the summary table.

#### Surrogate Recoveries:

- The volatile surrogate, toluene-d8, was recovered outside the control limits (high) for sediment samples S-10 and S-2. These samples were reanalyzed with this surrogate recovered outside the control limits (high) which may indicate matrix effects. The initial analysis was reported by the laboratory. The positive results in these samples may be biased high; however, there is no impact on the non-detected results and no qualifiers have been applied.
- The base/neutral surrogate, 2-fluorobiphenyl for all sediment samples (S-7, S-9, S-1, S-10, S-5, S-4, S-3 and S-2) and the acid-extractable surrogate, 2-fluorophenol for the surface water sample SW-4, were recovered outside the control limits (high). No qualifier has been applied to the sediment samples since only one surrogate per sample is outside the control limits. Likewise, no qualifier has been applied to sample SW-4 based on this surrogate recovery; however, this sample was qualified based on an assessment of the internal standard area performance (see Internal Standard Area Counts section of the report).
- The semivolatile surrogates, 2-fluorobiphenyl, terphenyl-d14 and phenol-d5, were recovered outside the control limits (low for 2-fluorobiphenyl and terphenyl-d14, and high for phenol-d5) for the groundwater sample FG-3GW. The acid extractable compounds may be biased high; however, no qualifier has been applied since all samples were reported as non-detected. The positive and non-detected base/neutral compound results for this sample are regarded as estimated values and have been flagged (J/UJ) estimated on the summary tables.

#### Internal Standard Area Counts:

- The area count of the volatile internal standard, chlorobenzene-d5, was outside the control limits (low) for the sediment sample S-10. The sample was reanalyzed with this internal standard outside the control limits (low). The initial analysis was reported by the laboratory and is deemed usable. The positive and non-detected compounds quantitated against this internal standard are regarded as estimated values and have been flagged (J/UJ) on the summary tables.
- The area counts of the semivolatile internal standards, chrysene-d12 and perylene-d12 for the surface water samples SW-4 and SW-15, and phenanthrene-d10 for the groundwater sample FG-3GW, were outside the control limits (high). The positive results of compounds quantitated against these internal standards may be biased high and have been

flagged (J) estimated on the summary tables. There is no impact on the data quality for those non-detected compounds quantitated against these internal standards and no qualifier has been applied.

#### Matrix Spike and Matrix Spike Duplicate Summary:

- The reproducibility of 2-chloroethylvinyl ether and dichlorodifluoromethane in the duplicate analysis of the volatile sediment sample S-9 is poor. The non-detected results of these compounds for this sample are regarded as estimated values and have been flagged (UJ) on the summary tables.
- The HP/T matrix spiking compound, 1,4-dioxane, was recovered outside the control limits (low) for the groundwater samples FG-3GWMS/MSD. No qualifier has been applied since the concentration of this compound in the unspiked sample is greater than 4 times the spike-added concentration.
- The blank spike recoveries of the HP/T volatile compounds, acrolein, acrylonitrile, 1,4-dioxane and isobutyl alcohol, associated with the groundwater samples FG-3GW and FG-4GW, were outside the control limits (low). All positive and non-detected results of these compounds in these groundwater samples may be biased low and have been flagged (J/UJ) estimated on the summary tables.
- Due to the low purge and trap (P/T) volatile blank spike recoveries of carbon disulfide, methylene chloride, iodomethane, and acetone associated with the groundwater samples FG-3GW and FG-4GW, the positive and non-detected results of these compounds may be biased low and have been flagged (J/UJ) estimated on the summary tables.
- The priority pollutant semivolatile blank spiking compounds, butylbenzyl phthalate, diethyl phthalate, dimethyl phthalate and 4-nitrophenol, associated with all surfacewater samples, were reported outside the control limits (low). The positive and non-detected results of these compounds in all surfacewater samples may be biased low and have been flagged (J/UJ) estimated on the summary tables.

#### Initial and Continuing Calibrations:

- Due to the high difference between the initial and continuing calibrations response factors ( $\%RDS > 30\%$  and  $\%D > 25$ ), all positive results for the following volatile compounds have been flagged (J) estimated. The

actual detection limit may be higher than reported and have been flagged (UJ) estimated on the summary table.

<u>Analyte</u>	<u>Log Link</u>	<u>Associated Sample</u>
All HP/T VOA Cmpds.	101424 101425	FG-3GW FG-4GW
Acetone, Methyl Bromide & Dichlorodifluoromethane	101424 101425	TB-111491 FG-4GW

- Due to the high difference between the initial and continuing calibration response factors (%RSD > 30% and %D > 25%), all positive results for the following semivolatile compounds have been flagged (J) estimated. The actual detection limit may be higher than reported and have been flagged (UJ) estimated on the summary table.

<u>Analyte</u>	<u>Log Link</u>	<u>Associated Sample</u>
Nitrobenzene	101421 101424 101425	S-1, S-7, S-9, S-10, SW-7, SW-9, SW-10 & SW-1 S-3, S-4 & S-5 S-2
4-Nitrophenol & Fluorene	101424 101425 101421	S-3, S-4 & S-5 S-2 S-7, S-9, S-1 & S-10
Hexachlorocyclopentadiene, Acenaphthene & Benzo(g,h,i)perylene	101424 101425	S-3, S-4 & S-5 S-2
Acenaphthylene	101421	S-7, S-9, S-1 & S-10
3,3'-Dichlorobenzidine	101421	SW-7, SW-9, SW-10 & SW-1

- The response factor of the P/T volatile compound, methyl ethyl ketone (MEK) in the initial and continuing calibrations associated with all groundwater samples FG-3GW and FG-4GW is less than 0.05. The non-detected MEK results are regarded as unusable and have been flagged (R) on the summary table.

#### Additional Comments:

- As per the requirements, all values calculated below the method detection limit should be considered estimated and have been flagged (J) on the summary tables.

## INORGANICS PARAMETER QUALIFIERS

### Hold Times:

- All samples were digested and analyzed within the required hold time criteria for all metals analyses.

### Blank Contamination:

- The following contaminants have been identified in the metals laboratory and/or field-blank samples at concentrations below the method detection limits (BMDL). The positive results of these analytes in the samples reported as BMDL are qualitatively questionable and have flagged (B) on Table 2. The positive results reported above the method detection limits (MDL) are regarded as "real" and no qualifier has been applied. The following samples have been flagged (B) on the summary tables.

<u>Analyte</u>	<u>Log Link</u>	<u>Associated Sample</u>
Lead	101424	FG-3GW
	101425	FG-4GW
Silver	101421	S-1, S-7, S-9 & S-10
	101425	S-2
Selenium	101421	S-9
	101424	S-3, S-4 & S-5

### Instrument Calibration and Verification:

- The initial and continuing calibration verification recoveries of all metals were reported within control limits.

### ICP Serial Dilution:

- The ICP serial dilution was performed on non-project batch samples for both soil and aqueous matrices. Although the percent differences (%D) of some analytes were outside the control limits for the serial dilution samples, no qualifier has been applied.

### Matrix Spike and Duplicate Summary:

- The blank spike recovery of silver, associated with the sediment samples S-5, S-4 and S-3, was outside the control limits (low). The positive

and/or non-detected results of this analyte may be biased low and have been flagged (J/UJ) estimated on the summary table.

#### Post-Digestion Spike Recoveries:

- The post-spike recoveries of the following analytes were recovered outside the control limits (low). Positive and/or non-detected results of these analytes for the associated samples may be biased low and have been flagged (J) estimated.

<u>Analyte</u>	<u>Log Link</u>	<u>Associated Sample</u>
Arsenic	101424	FG-3GW
	101425	FG-4GW
Selenium	101421	S-3, S-4, S-5, SW-7, SW-9, SW-10 & SW-1
	101424	S-1, S-9, SWFB-111491 & SW-5
	101425	S-2, SW-2, SW-15
Thallium	101421	SW-1, SW-7, SW-9, SW-10
	101424	SEDFB-111491, SW-3, SW-4 & SW-5

- The post-spike recoveries of the following analytes were recovered outside the control limits (high). The positive results of these analytes for the associated samples may be biased high and have been flagged (J) estimated on the summary tables.

<u>Analyte</u>	<u>Log Link</u>	<u>Associated Sample</u>
Arsenic	101421	S-7, S-9 & S-10
	101425	S-2

#### Additional Comments:

- The laboratory reports several inorganic results as below the method detection limit (BMDL). These are reported on Table 2. The actual concentrations were not calculated during the data validation review since the interelement coefficient factors were not provided.

TABLE 2  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number			FW-3GW	FW-4GW
Laboratory Sample Number			HA6535	HA6539
Sampling Date	Quant	Quant	11/12/91	11/14/91
Dilution Factor	Limit	Limit	1.0	1.0
Units	ug/L	ug/Kg	ug/L	ug/L
APPENDIX IX HEATED P/T VOLATILE COMPOUNDS				
Acetonitrile	15	15	UJ	UJ
Acrolein	20	20	UJ	UJ
Acrylonitrile	10	10	UJ	UJ
1,4-Dioxane	300	300	2180 J	66 J
Ethyl cyanide	40	40	UJ	UJ
Isobutyl alcohol	230	230	UJ	28 J
Methacrylonitrile	110	110	UJ	5 JB

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO INCINERATOR FACILITY

Dames and Moore Sample Number			FW-3GW	FW-4GW
Laboratory Sample Number			HA6535	HA6539
Sampling Date	Quant	Quant	11/12/91	11/14/91
Dilution Factor	Limit	Limit	1.0	1.0
Units	ug/L	ug/Kg	ug/L	ug/L
APPENDIX IX P/T VOLATILE COMPOUNDS				
Benzene	4.4	4.4	U	9.87
Methyl bromide	10	10	U	U
Carbon disulfide	10	10	UJ	UJ
Chloroethane	10	10	U	U
Chlorobenzene	6.0	6.0	U	U
2-Chloro-1,3-butadiene	-	-	U	U
Chloroform	1.6	1.6	U	U
Methyl chloride	10	10	U	U
3-Chloropropene	10	10	U	U
1,2-Dibromo-3-chloropropane	10	10	U	U
1,2-Dibromoethane	10	10	U	U
Dibromomethane	10	10	U	U
1,4-Dichloro-2-butene	10	10	U	U
Dichlorodifluoromethane	10	10	U	UJ
1,1-Dichloroethane	4.7	4.7	13	4.1 J
1,2-Dichloroethane	2.8	2.8	U	U
1,2-Dichloroethene (trans)	1.6	1.6	U	12.9
1,1-Dichloroethene	2.8	2.8	U	46.3
Methylene Chloride	2.8	2.8	UJ	UJ
1,2-Dichloropropane	6.0	6.0	U	U
cis-1,3-Dichloropropene	5.0	5.0	U	U
trans-1,3-Dichloropropene	10	10	U	U
Chlorodibromomethane	3.1	3.1	U	U
Dichlorobromomethane	2.2	2.2	U	U
Ethyl methacrylate	10	10	U	U
Iodomethane	10	10	UJ	UJ
Methyl ethyl ketone	10	10	R	R
Methyl methacrylate	10	10	U	U
Pentachloroethane	-	-	U	U
1,1,1,2-Tetrachloroethane	10	10	U	U
1,1,2,2-Tetrachloroethane	4.1	4.1	U	U
Tetrachloroethene	4.1	4.1	U	U
Carbon Tetrachloride	2.8	2.8	U	U
Toluene	6.0	6.0	U	3.2 J
Bromoform	4.7	4.7	U	U
1,1,1-Trichloroethane	3.8	3.8	U	U
1,1,2-Trichloroethane	5.0	5.0	U	U

continued on next page (see last page for notes)



TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO INCINERATOR FACILITY

Dames and Moore Sample Number			FW-3GW	FW-4GW
Laboratory Sample Number			HA6535	HA6539
Sampling Date			11/12/91	11/14/91
Dilution Factor			1.0	1.0
Units	Quant Limit ug/L	Quant Limit ug/Kg	ug/L	ug/L
APPENDIX IX P/T VOLATILE COMPOUNDS (continued)				
Trichloroethene	1.9	1.9	U	3.11
Trichlorofluoromethane	10	10	U	U
1,2,3-Trichloropropane	10	10	U	U
Vinyl Chloride	10	10	U	21.7
Acetone	10	10	UJ	49.9 J
Ethylbenzene	7.2	7.2	U	U
2-Hexanone	10	10	U	U
Methyl isobutyl ketone	10	10	U	7.5 J
Styrene	10	10	U	U
Vinyl acetate	10	10	U	U
m-Xylene	10	10	U	1.6 J
o,p-Xylenes	10	10	U	U

continued on next page (see last page for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number			FW-3GW	FW-4GW
Laboratory Sample Number			HA6535	HA6539
Sampling Date	Quant	Quant	11/12/91	11/14/91
Dilution Factor	Limit	Limit	1.0/20	1.0
Units	ug/L	ug/Kg	ug/L	ug/L
APPENDIX IX SEMIVOLATILE COMPOUNDS				
Acetophenone	17	1000	UJ	U
2-Acetylaminofluorene	17	1000	UJ	U
4-Aminobiophenyl	17	1000	UJ	U
Aniline	17	1000	UJ	U
Aramite	17	1000	UJ	U
Benzo(a)anthracene	13	790	17.6 J	U
Benzo(b)fluoranthene	8.0	490	18.9 J	U
Benzo(a)pyrene	4.2	250	15.0 J	U
Bis(2-Chloroethoxy)methane	8.8	540	UJ	U
Bis(2-chloroethyl) ether	9.5	580	UJ	U
Bis(2-chloroisopropyl) ether	9.5	580	UJ	U
Bis(2-Ethylhexyl)phthalate	17	1000	UJ	U
4-Bromophenylphenyl ether	3.2	190	UJ	U
Butylbenzylphthalate	17	1000	UJ	U
2-sec-Butyl-4,6-dinitrophen	17	1000	UJ	U
p-Chloraniline	17	1000	UJ	U
p-Chloro-m-cresol	5.0	300	U	U
2-Chloranaphthalene	3.2	190	UJ	U
2-Chlorophenol	5.5	330	583	31.6
Chrysene	4.2	250	17.1 J	U
Acenaphthene	3.2	190	8.82 J	U
Acenaphthylene	5.8	350	UJ	U
Anthracene	3.2	190	17.4 J	U
Benzo(ghi)perylene	6.8	415	10.4 J	U
Benzo(k)fluoranthene	4.2	250	U	U
Fluorene	3.2	190	9.8	U
Phenanthrene	9.0	550	61.7	3.4 J
Pyrene	3.2	190	59.8	2.8 J
2-Nitrophenol	6.0	385	U	U
o-Cresol	17	1000	U	7.3 J
m+p-Cresols	17	1000	2270 J*	122
Diallate	17	1000	UJ	U
Dibenzo(a,h)anthracene	4.2	250	UJ	U
Di-N-butyl phthalate	17	1000	UJ	U
1,2-Dichlorobenzene	3.2	190	UJ	U
1,3-Dichlorobenzene	3.2	190	UJ	U
1,4-Dichlorobenzene	7.3	450	UJ	U
3,3-Dichlorobenzidine	27.5	1675	UJ	U
2,4-Dichlorophenol	4.5	275	2000 J*	178
2,6-Dichlorophenol	17	1000	390 J	U

continued next page (see last page of table for notes)

TABLE 2  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number			FW-3GW	FW-4GW
Laboratory Sample Number			HA6535	HA6539
Sampling Date			11/12/91	11/14/91
Dilution Factor			1.0/20	1.0
Units	Quant Limit ug/L	Quant Limit ug/Kg	ug/L	ug/L
APPENDIX IX SEMIVOLATILE COMPOUNDS (continued)				
Diethylphthalate	17	1000	UJ	U
p-Dimethylaminoazobenzene	17	1000	UJ	U
7,12-Dimethylbenzo(a)anthra	17	1000	UJ	U
3,3-Dimethylbenzidine	17	1000	UJ	U
a-a-Dimethylphenethylamine	-	-	-	-
2,4-Dimethylphenol	4.5	275	U	U
Dimethyl phthalate	17	1000	UJ	6.19
m-Dinitrobenzene	17	1000	UJ	U
4,6-Dinitro-0-cresol	40	2400	U	U
2,4-Dinitrophenol	70	4250	U	U
2,4-Dinitrotoluene	9.5	580	UJ	U
2,6-Dinitrotoluene	3.2	190	UJ	U
Di-n-octyl phthalate	17	1000	UJ	U
Diphenylamine	17	1000	UJ	U
N-nitrosodipropylamine	17	1000	UJ	U
Ethyl methanesulfonate	17	1000	UJ	U
Fluoranthene	3.7	225	55.3 J	2.6 J
Hexachlorobenzene	3.2	190	UJ	U
Hexachlorobutadiene	1.5	90	UJ	U
Hexachlorocyclopentadiene	17	1000	UJ	U
Hexachloroethane	2.7	165	UJ	U
Isodrin	9.8	1000	UJ	U
Hexachlorophene	17	1000	UJ	U
Hexachloropropene	17	1000	UJ	U
Indeno(1,2,3-c,d)pyrene	6.2	385	11.3 J	U
Isosafrole	17	600	UJ	U
Methapyrilene	-	-	IND	IND
3-Methylcholanthrene	9.2	555	UJ	U
Methyl methanesulfonate	17	1000	UJ	U
Naphthalene	2.7	165	66.2 J	5.68
1,4-Naphthoquinone	17	1000	UJ	U
1-Naphthylamine	17	1000	UJ	U
2-Naphthylamine	17	1000	UJ	U
p-Nitroaniline	17	1000	UJ	U
Nitrobenzene	3.2	190	UJ	U
4-Nitrophenol	4.0	240	U	U
4-Nitroquinoline-N-oxide	-	-	IND	IND
N-Nitrosodiphenylamine	3.2	190	UJ	U
N-Nitrosodi-n-butylamine	17	1000	UJ	U
N-Nitrosodietethylamine	17	1000	UJ	U
N-Nitrosodimethylamine	17	1000	UJ	U
N-Nitrosomethylethylamine	17	1000	UJ	U

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number			FW-3GW	FW-4GW
Laboratory Sample Number			HA6535	HA6539
Sampling Date	Quant	Quant	11/12/91	11/14/91
Dilution Factor	Limit	Limit	1.0	1.0
Units	ug/L	ug/Kg	ug/L	ug/L
APPENDIX IX SEMIVOLATILE COMPOUNDS (continued)				
N-Nitrosomorpholine	17	1000	UJ	U
N-Nitrosopiperidine	17	1000	UJ	U
N-Nitrosopyrrolidine	17	1000	UJ	U
5-Nitro-o-toluidine	17	1000	UJ	U
Pentachlorobenzene	17	1000	UJ	U
Pentachloronitrobenzene	17	1000	UJ	U
Pentachlorophenol	6.0	365	25.4 J	U
Phenacetin	17	1000	UJ	U
Phenol	2.5	150	5490 J*	577 *
m-phenylenediamine	17	1000	UJ	U
o-phenylenediamine	17	1000	UJ	U
p-phenylenediamine	17	1000	UJ	U
2-Picoline	17	1000	UJ	U
Pronamide	17	1000	UJ	U
Pyridine	17	1000	713 J*	12.6 J
Safrole	17	1000	UJ	U
1,2,4,5-Tetrachlorobenzene	17	1000	UJ	U
2,3,4,6-Tetrachlorophenol	17	1000	UJ	U
Tetraethyldithiopyrophospha	-	-	UJ	U
o-Toluidine	17	1000	UJ	U
1,2,4-Trichlorobenzene	3.2	180	UJ	U
2,4,5-Trichlorophenol	17	1000	U	U
2,4,6-Trichlorophenol	4.5	275	U	1.7 J
0,0,0-Triethyl phosphorothi	-	-	UJ	U
sym-Trinitrobenzene	-	-	IND	IND
Benzyl alcohol	17	1000	UJ	23.1
Dibenzofuran	17	1000	7.4 J	U
Isophorone	3.7	225	UJ	U
2-Methylnaphthalene	17	1000	29.1 J	U
o-Nitroaniline	17	1000	UJ	U
m-Nitroaniline	17	1000	UJ	U
4-Chlorophenyl phenyl ether	7.0	425	UJ	U

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number			SW-1	SW-2	SW-3	SW-4	SW-5	SW-6	SW-7	SW-8	SW-10	SW-15	SEDFB01
Laboratory Sample Number			HA6700	HA6692	HA6703	HA6691	HA6690	HA6760	HA6694	HA6695	HA6696	HA6693	HA6683
Sampling Date	Quant	Quant	11/13/91	11/15/91	11/14/91	11/14/91	11/14/91	11/15/91	11/13/91	11/13/91	11/13/91	11/15/91	11/14/91
Dilution Factor	Limit	Limit	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Units	ug/L	ug/Kg	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
PRIORITY POLLUTANT P/T VOLATILE COMPOUNDS													
Benzene	4.4	4.4	U	U	U	U	U	U	U	U	U	U	U
Bromoform	4.7	4.7	U	U	U	U	U	U	U	U	U	U	U
Carbon Tetrachloride	2.8	2.8	U	U	U	U	U	U	U	U	U	U	U
Chlorobenzene	6.0	6.0	U	U	U	U	U	U	U	U	BMDL	U	U
Chlorodibromomethane	3.1	3.1	U	U	U	U	U	U	U	U	U	U	U
Chloroethane	10	10	U	U	U	U	U	U	U	U	U	U	U
2-Chloroethyl vinyl ether	10	10	U	U	U	U	U	U	U	U	U	U	U
Chloroform	1.6	1.6	U	U	U	U	U	U	U	U	U	U	U
Dichlorobromomethane	2.2	2.2	U	U	U	U	U	U	U	U	U	U	U
Dichlorodifluoromethane	10	10	U	U	U	U	U	U	U	U	U	U	U
1,1-Dichloroethane	4.7	4.7	U	U	U	U	U	U	U	U	U	U	U
1,2-Dichloroethane	2.8	2.8	U	U	U	U	U	U	U	U	U	U	U
1,1-Dichloroethene	2.8	2.8	U	U	U	U	U	U	U	U	U	U	U
1,2-Dichloropropane	6.0	6.0	U	U	U	U	U	U	U	U	U	U	U
cis-1,3-Dichloropropene	5.0	5.0	U	U	U	U	U	U	U	U	U	U	U
trans-1,3-Dichloropropene	10	10	U	U	U	U	U	U	U	U	U	U	U
Ethylbenzene	7.2	7.2	U	U	U	U	U	U	U	U	U	U	U
Methyl bromide	10	10	U	U	U	U	U	U	U	U	U	U	U
Methyl chloride	10	10	U	U	U	U	U	U	U	U	U	U	U
Methylene Chloride	2.8	2.8	U	U	U	U	U	U	U	U	U	U	U
1,1,2,2-Tetrachloroethane	4.1	4.1	U	U	3.7	U	U	U	U	U	BMDL	U	U
Tetrachloroethene	4.1	4.1	U	U	U	U	U	U	U	U	U	U	U
Toluene	6.0	6.0	U	U	U	U	U	U	U	U	BMDL	U	U
1,2-Dichloroethene (trans)	1.6	1.6	U	U	U	U	U	U	U	U	U	U	U
1,1,1-Trichloroethane	3.6	3.6	U	U	U	U	U	U	U	U	U	U	U
1,1,2-Trichloroethane	5.0	5.0	U	U	U	U	U	U	U	U	U	U	U
Trichloroethene	1.9	1.9	U	U	U	U	U	U	U	U	U	U	U
Trichlorofluoromethane	10	10	U	U	U	U	U	U	U	U	U	U	U
Vinyl Chloride	10	10	U	U	U	U	U	U	U	U	U	U	U

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number			SW-1	SW-2	SW-3	SW-4	SW-5	SW-6	SW-7	SW-9	SW-10	SW-15	SEDFB01
Laboratory Sample Number			HA6700	HA6692	HA6703	HA6691	HA6690	HA6760	HA6694	HA6695	HA6696	HA6693	HA6683
Sampling Date	Quant	Quant	11/13/91	11/15/91	11/14/91	11/14/91	11/14/91	11/15/91	11/13/91	11/13/91	11/13/91	11/15/91	11/14/91
Dilution Factor	Limit	Limit	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Units	ug/L	ug/Kg	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
ACID EXTRACTABLE COMPOUNDS													
2-Chlorophenol	3.9	340	U	U	U	U	U	NA	U	U	U	U	U
2,4-Dichlorophenol	3.2	280	U	U	U	U	U	NA	U	U	U	U	U
2,4-Dimethylphenol	3.2	280	U	U	U	U	U	NA	U	U	U	U	U
4,6-Dinitro-2-methylphenol	29	2400	U	U	U	U	U	NA	U	U	U	U	U
2,4-Dinitrophenol	50	4300	U	U	U	U	U	NA	U	U	U	U	U
2-Nitrophenol	4.3	370	U	U	U	U	U	NA	U	U	U	U	U
4-Nitrophenol	2.9	240	UJ	UJ	UJ	UJ	UJ	NA	UJ	UJ	UJ	UJ	UJ
4-Chloro-3-methylphenol	3.6	310	U	U	U	U	U	NA	U	U	U	U	U
Pentachlorophenol	4.3	370	U	U	U	U	U	NA	U	U	U	U	U
Phenol	1.8	150	U	U	U	U	U	NA	U	U	U	U	U
2,4,6-Trichlorophenol	3.2	280	U	U	U	U	U	NA	U	U	U	U	U

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number Laboratory Sample Number Sampling Date Dilution Factor Units	Quant Limit ug/L	Quant Limit ug/Kg	SW-1 HA6700 11/13/91 1.0 ug/L	SW-2 HA6692 11/15/91 1.0 ug/L	SW-3 HA6703 11/14/91 1.0 ug/L	SW-4 HA6691 11/14/91 1.0 ug/L	SW-5 HA6690 11/14/91 1.0 ug/L	SW-6 HA6700 11/15/91 1.0 ug/L	SW-7 HA6694 11/13/91 1.0 ug/L	SW-8 HA6695 11/13/91 1.0 ug/L	SW-10 HA6696 11/13/91 1.0 ug/L	SW-15 HA6693 11/15/91 1.0 ug/L	SWFB01 HA6706 11/14/91 1.0 ug/L	
BASE/NEUTRAL EXTRACTABLE COMPOUNDS														
Acenaphthene	2.3	220	U	U	U	U	U	NA	U	U	U	U	U	
Acenaphthylene	4.2	410	U	U	U	U	U	NA	U	U	U	U	U	
Anthracene	2.3	220	U	U	U	U	U	NA	U	U	U	U	U	
Benzo(a)anthracene	9.3	910	U	U	U	UJ	U	NA	U	U	U	UJ	U	
Benzo(a)pyrene	3.0	290	U	U	U	UJ	U	NA	U	U	U	UJ	U	
Benzo(b)fluoranthene	5.7	560	U	U	U	UJ	U	NA	U	U	U	UJ	U	
Benzo(g,h,i)perylene	4.9	480	U	U	U	UJ	U	NA	U	U	U	UJ	U	
Benzo(k)fluoranthene	3.0	290	U	U	U	UJ	U	NA	U	U	U	UJ	U	
bis(2-Chloroethoxy)methane	6.3	620	U	U	U	U	U	NA	U	U	U	U	U	
Bis(2-chloroethyl) ether	6.8	660	U	U	U	U	U	NA	U	U	U	U	U	
bis(2-chloroisopropyl)ether	6.8	660	U	U	U	U	U	NA	U	U	U	U	U	
bis(2-Ethylhexyl)phthalate	12	1200	U	U	U	UJ	U	NA	U	U	U	UJ	U	
4-Bromophenylphenyl ether	2.3	220	U	U	U	U	U	NA	U	U	U	U	U	
Butylbenzylphthalate	12	1200	UJ	UJ	UJ	UJ	UJ	NA	UJ	UJ	UJ	UJ	UJ	
2-Chloronaphthalene	2.3	220	U	U	U	U	U	NA	U	U	U	U	U	
4-Chlorophenylphenyl ether	5.0	490	U	U	U	U	U	NA	U	U	U	U	U	
Chrysene	3.0	290	U	U	U	UJ	U	NA	U	U	U	UJ	U	
Dibenz(a,h)anthracene	3.0	290	U	U	U	UJ	U	NA	U	U	U	U	U	
1,2-Dichlorobenzene	2.3	220	U	U	U	U	U	NA	U	U	U	U	U	
1,3-Dichlorobenzene	2.3	220	U	U	U	U	U	NA	U	U	U	U	U	
1,4-Dichlorobenzene	5.2	510	U	U	U	U	U	NA	U	U	U	U	U	
3,3'-Dichlorobenzidine	19.6	1920	UJ	U	U	UJ	U	NA	UJ	UJ	UJ	UJ	U	
Diethylphthalate	12	1200	UJ	UJ	UJ	UJ	UJ	NA	UJ	UJ	UJ	UJ	UJ	
Dimethylphthalate	12	1200	UJ	UJ	UJ	UJ	UJ	NA	UJ	UJ	UJ	UJ	UJ	
Di-n-butylphthalate	12	1200	U	U	U	U	U	NA	U	U	U	U	U	
2,4-Dinitrotoluene	6.8	660	U	U	U	U	U	NA	U	U	U	U	U	
2,6-Dinitrotoluene	2.3	220	U	U	U	U	U	NA	U	U	U	U	U	
Di-n-octylphthalate	12	1200	U	U	U	UJ	U	NA	U	U	U	UJ	U	
Fluoranthene	2.6	260	U	U	U	U	U	NA	U	U	U	U	U	
Fluorene	2.3	220	U	U	U	U	U	NA	U	U	U	U	U	
Hexachlorobenzene	2.3	220	U	U	U	U	U	NA	U	U	U	U	U	
Hexachlorobutadiene	1.1	100	U	U	U	U	U	NA	U	U	U	U	U	
Hexachlorocyclopentadiene	12	1200	U	U	U	U	U	NA	U	U	U	U	U	
Hexachloroethane	1.9	190	U	U	U	U	U	NA	U	U	U	U	U	
Indeno(1,2,3-cd)pyrene	4.4	430	U	U	U	UJ	U	NA	U	U	U	UJ	U	
Isophorone	2.6	260	U	U	U	U	U	NA	U	U	U	U	U	
Naphthalene	1.9	190	U	U	U	U	U	NA	U	U	UJ	U	U	
Nitrobenzene	2.3	220	UJ	U	U	U	U	NA	U	U	U	U	U	
N-Nitroso-dimethylamine	12	1200	U	U	U	U	U	NA	U	U	U	U	U	
N-Nitroso-di-n-propylamine	12	1200	U	U	U	U	U	NA	U	U	U	U	U	
N-Nitroso-diphenylamine	2.3	220	U	U	U	U	U	NA	U	U	U	U	U	
Phenanthrene	6.4	630	U	U	U	U	U	NA	U	U	U	UJ	U	
Pyrene	2.3	220	U	U	U	UJ	U	NA	U	U	U	U	U	
1,2,4-Trichlorobenzene	2.3	220	U	U	U	U	U	NA	U	U	U	U	U	

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number	Quant Limit	Quant Limit	SW-1	SW-2	SW-3	SW-4	SW-5	SW-7	SW-9	SW-10	SW-15	FG-3GW	FG-4GW
Laboratory Sample Number	Limit	Limit	HA6700	HA6692	HA6703	HA6691	HA6690	HA6694	HA6695	HA6696	HA6693	HA6535	HA6539
Sampling Date	ug/L	ug/Kg	11/13/91	11/15/91	11/14/91	11/14/91	11/14/91	11/13/91	11/13/91	11/13/91	11/15/91	11/12/91	11/14/91
Units	ug/L	ug/Kg	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/Kg	ug/Kg
INORGANIC PARAMETERS													
Antimony	60	6000	U	U	U	U	U	U	U	U	U	120 J	BMDL J
Arsenic	100	1000	U	U	U	U	U	U	BMDL	BMDL	U	620	BMDL
Barium	20	2000	NA	NA	NA	NA	NA	NA	NA	NA	NA	970	79
Beryllium	1.0	100	U	U	U	U	U	U	U	U	U	BMDL	U
Cadmium	3.0	200	U	U	U	U	U	U	U	U	U	U	U
Chromium	10	1000	U	U	U	U	U	U	U	U	U	BMDL	U
Cobalt	20	2000	NA	NA	NA	NA	NA	NA	NA	NA	NA	U	U
Copper	10	1000	U	U	U	U	U	U	U	U	BMDL	11	U
Lead	5.0	500	U	U	U	U	U	U	U	U	U	6.3	BMDL B
Mercury	0.20	80	BMDL	U	U	U	0.20	U	U	U	U	U	U
Nickel	20	1000	U	U	U	U	U	U	U	U	U	220	BMDL
Selenium	5.0	500	BMDL J	BMDL J	BMDL	BMDL	BMDL J	BMDL J	UJ	UJ	UJ	12	BMDL
Silver	10	1000	U	U	U	U	U	U	U	U	U	U	U
Thallium	10	1000	UJ	U	UJ	UJ	UJ	UJ	UJ	UJ	U	U	U
Tin	50	5000	NA	NA	NA	NA	NA	NA	NA	NA	NA	89	U
Vanadium	20	2000	NA	NA	NA	NA	NA	NA	NA	NA	NA	U	26
Zinc	20	2000	U	U	U	U	U	U	U	U	U	BMDL	U

LEGEND:

- U Compound was not detected at laboratory method detection limit.
  - J Estimated value due to limitations identified during the quality assurance review.
  - UJ Reported method detection limit is estimated due to limitations identified during the quality assurance review.
  - B Compound was detected in a laboratory and/or field blank at similar concentrations. May represent laboratory and/or field contamination.
  - R Unreliable result. Compound may or may not be present.
  - = Sample analyzed at multiple dilutions. Summary table is a hybrid of diluted and undiluted results.
  - No standard available. Compound was qualitatively searched for.
  - IND Indeterminate. Standard and/or spikes could not be detected at method detection limit.
  - BMDL Below Method Detection Limit reported by laboratory.
- Discrepancies may exist between the laboratory data tables and the data validation summary tables due to variations in the rounding of calculations.



TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number			SWFB01	TB111391	TB111401	TB111591	B S-1	B S-2	B S-3	B S-4	B S-5	B S-7	B S-8	B S-10
Laboratory Sample Number			HA6706	HA6707	HA6709	HA6684	HA6676	HA6679	HA6677	HA6676	HA6675	HA6673	HA6674	HA6679
Sampling Date	Quant	Quant	11/14/91	11/13/91	11/14/91	11/15/91	11/13/91	11/15/91	11/14/91	11/14/91	11/14/91	11/13/91	11/13/91	11/13/91
Dilution Factor	Limit	Limit	1.0	1.0	1.0	1.0	1.3	1.3	1.3	1.3	1.2	1.1	1.4	1.3
Units	ug/L	ug/Kg	ug/L	ug/L	ug/L	ug/L	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
PRIORITY POLLUTANT P/T VOLATILE COMPOUNDS														
Benzene	4.4	4.4	U	U	U	U	U	U	13	13	7.61	U	U	U
Bromoform	4.7	4.7	U	U	U	U	U	U	U	U	U	U	U	U
Carbon Tetrachloride	2.8	2.8	U	U	U	U	U	U	U	U	U	U	U	U
Chlorobenzene	6.0	6.0	U	U	U	U	U	U	U	U	U	U	U	U
Chlorodibromomethane	3.1	3.1	U	U	U	U	U	U	U	U	U	U	U	U
Chloroethane	10	10	U	U	U	U	U	U	U	U	U	U	U	U
2-Chloroethyl vinyl ether	10	10	U	U	U	U	U	U	U	U	U	U	U	U
Chloroform	1.6	1.6	U	U	U	U	U	U	U	U	U	U	U	U
Dichlorobromomethane	2.2	2.2	U	U	U	U	U	U	U	U	U	U	U	U
Dichlorodifluoromethane	10	10	U	U	U	U	U	U	U	U	U	U	U	U
1,1-Dichloroethane	4.7	4.7	U	U	U	U	U	U	U	U	U	U	U	U
1,2-Dichloroethane	2.8	2.8	U	U	U	U	U	U	U	U	U	U	U	U
1,1-Dichloroethane	2.8	2.8	U	U	U	U	U	U	U	U	U	U	U	U
1,2-Dichloropropane	6.0	6.0	U	U	U	U	U	U	U	U	U	U	U	U
cis-1,3-Dichloropropene	5.0	5.0	U	U	U	U	U	U	U	U	U	U	U	U
trans-1,3-Dichloropropene	10	10	U	U	U	U	U	U	U	U	U	U	U	U
Ethylbenzene	7.2	7.2	U	U	U	U	U	U	U	U	U	U	U	U
Methyl bromide	10	10	U	U	U	U	U	U	U	U	U	U	U	U
Methyl chloride	10	10	U	U	U	U	U	U	U	U	U	U	U	U
Methylene Chloride	2.8	2.8	U	U	U	U	U	U	U	U	U	U	U	U
1,1,2,2-Tetrachloroethane	4.1	4.1	U	U	U	U	U	U	U	U	U	U	U	U
Tetrachloroethene	4.1	4.1	U	U	U	U	U	U	U	U	U	U	U	U
Toluene	6.0	6.0	U	U	U	U	U	U	U	U	U	U	U	U
1,2-Dichloroethene (trans)	1.6	1.6	U	U	U	U	U	U	U	U	U	U	U	U
1,1,1-Trichloroethane	3.8	3.8	U	U	U	U	U	U	U	U	U	U	U	U
1,1,2-Trichloroethane	5.0	5.0	U	U	U	U	U	U	U	U	U	U	U	U
Trichloroethene	1.9	1.9	U	U	U	U	U	U	U	U	U	U	U	U
Trichlorodifluoromethane	10	10	U	U	U	U	U	U	U	U	U	U	U	U
Vinyl Chloride	10	10	U	U	U	U	U	U	U	U	U	U	U	U

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number			SWFB01	TB 111391	TB 111401	TB 111591	B S-1	B S-2	B S-3	B S-4	B S-5	B S-7	B S-9	B S-10
Laboratory Sample Number			HA6706	HA6707	HA6709	HA6884	HA6878	HA6880	HA6877	HA6876	HA6875	HA6873	HA6874	HA6879
Sampling Date	Quant	Quant	11/14/91	11/13/91	11/14/91	11/15/91	11/13/91	11/15/91	11/14/91	11/14/91	11/14/91	11/13/91	11/13/91	11/13/91
Dilution Factor	Limit	Limit	1.0	1.0	1.0	1.0	1.3	1.3	1.3	1.3	1.2	1.1	1.4	1.3
Units	ug/L	ug/Kg	ug/L	ug/L	ug/L	ug/L	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
ACID EXTRACTABLE COMPOUNDS														
2-Chlorophenol	3.9	340	U	NA	NA	NA	U	U	U	U	U	U	U	U
2,4-Dichlorophenol	3.2	280	U	NA	NA	NA	U	U	U	U	U	U	U	U
2,4-Dimethylphenol	3.2	280	U	NA	NA	NA	U	U	U	U	U	U	U	U
4,6-Dinitro-2-methylphenol	29	2400	U	NA	NA	NA	U	U	U	U	U	U	U	U
2,4-Dinitrophenol	50	4300	U	NA	NA	NA	U	U	U	U	U	U	U	U
2-Nitrophenol	4.3	370	U	NA	NA	NA	U	U	U	U	U	U	U	U
4-Nitrophenol	2.9	240	UJ	NA	NA	NA	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
4-Chloro-3-methylphenol	3.6	310	U	NA	NA	NA	U	U	U	U	U	U	U	U
Pentachlorophenol	4.3	370	U	NA	NA	NA	U	U	U	U	U	U	U	U
Phenol	1.6	150	U	NA	NA	NA	U	U	U	U	U	U	U	U
2,4,6-Trichlorophenol	3.2	280	U	NA	NA	NA	U	U	U	U	U	U	U	U

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number	Quant	Quant	SEDFO1	TB111391	TB111401	TB111591	B 8-1	B 8-2	B 8-3	B 8-4	B 8-5	B 8-7	B 8-9	B 8-10
Laboratory Sample Number	Limit	Limit	HA6663	HA6707	HA6709	HA6664	HA6676	HA6680	HA6677	HA6676	HA6675	HA6673	HA6674	HA6679
Sampling Date	ug/L	ug/Kg	11/14/91	11/13/91	11/14/91	11/15/91	11/13/91	11/15/91	11/14/91	11/14/91	11/14/91	11/13/91	11/13/91	11/13/91
Dilution Factor	1.0	1.0	1.0	1.0	1.0	1.0	13	12	1.3	1.3	1.2	1.1	1.4	1.3
Units	ug/L	ug/Kg	ug/L	ug/L	ug/L	ug/L	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
BASE/NEUTRAL EXTRACTABLE COMPOUNDS														
Acenaphthene	2.3	220	U	NA	NA	NA	U	UJ	UJ	UJ	UJ	U	U	U
Acenaphthylene	4.2	410	U	NA	NA	NA	UJ	U	U	U	U	UJ	UJ	UJ
Anthracene	2.3	220	U	NA	NA	NA	2100 J	U	U	U	U	U	U	U
Benzo(a)anthracene	9.3	910	U	NA	NA	NA	6000 J	U	U	U	U	U	U	3100 J
Benzo(a)pyrene	3.0	290	U	NA	NA	NA	4740	U	U	U	U	U	U	U
Benzo(b)fluoranthene	5.7	560	U	NA	NA	NA	9290	U	U	U	U	U	U	3100 J
Benzo(g,h,i)perylene	4.9	480	U	NA	NA	NA	4200 J	UJ	UJ	UJ	UJ	U	U	U
Benzo(k)fluoranthene	3.0	290	U	NA	NA	NA	3600	U	U	U	U	U	U	U
bis(2-Chloroethoxy)methane	6.3	620	U	NA	NA	NA	U	U	U	U	U	U	U	U
Bis(2-chloroethyl) ether	6.6	660	U	NA	NA	NA	U	U	U	U	U	U	U	U
bis(2-chloroisopropyl)ether	6.6	660	U	NA	NA	NA	U	U	U	U	U	U	U	U
bis(2-Ethylhexyl)phthalate	12	1200	U	NA	NA	NA	U	U	U	U	U	U	U	U
4-Bromophenylphenyl ether	2.3	220	U	NA	NA	NA	U	U	U	U	U	U	U	U
Butylbenzylphthalate	12	1200	U	NA	NA	NA	U	U	U	U	U	U	U	U
2-Chloronaphthalene	2.3	220	U	NA	NA	NA	U	U	U	U	U	U	U	U
4-Chlorophenylphenyl ether	5.0	490	U	NA	NA	NA	U	U	U	U	U	U	U	U
Chrysene	3.0	290	U	NA	NA	NA	7160	U	U	U	U	U	U	3200 J
Dibenz(a,h)anthracene	3.0	290	U	NA	NA	NA	U	U	U	U	U	U	U	U
1,2-Dichlorobenzene	2.3	220	U	NA	NA	NA	U	U	U	U	U	U	U	U
1,3-Dichlorobenzene	2.3	220	U	NA	NA	NA	U	U	U	U	U	U	U	U
1,4-Dichlorobenzene	5.2	510	U	NA	NA	NA	U	U	U	U	U	U	U	U
3,3'-Dichlorobenzidine	19.6	1920	U	NA	NA	NA	U	U	U	U	U	U	U	U
Diethylphthalate	12	1200	U	NA	NA	NA	U	U	U	U	U	U	U	U
Dimethylphthalate	12	1200	U	NA	NA	NA	U	U	U	U	U	U	U	U
Di-n-butylphthalate	12	1200	U	NA	NA	NA	U	1300	3300 J	5900 J	2500 J	5000 J	U	2900 J
2,4-Dinitrotoluene	6.6	660	U	NA	NA	NA	U	U	U	U	U	U	U	U
2,6-Dinitrotoluene	2.3	220	U	NA	NA	NA	U	U	U	U	U	U	U	U
Di-n-octylphthalate	12	1200	U	NA	NA	NA	U	U	U	U	U	U	U	U
Fluoranthene	2.6	260	U	NA	NA	NA	16100	1600	2860	1500 J	U	U	U	8070
Fluorene	2.3	220	U	NA	NA	NA	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Hexachlorobenzene	2.3	220	U	NA	NA	NA	U	U	U	U	U	U	U	U
Hexachlorobutadiene	1.1	100	U	NA	NA	NA	U	U	U	U	U	U	U	U
Hexachlorocyclopentadiene	12	1200	U	NA	NA	NA	U	UJ	UJ	UJ	UJ	U	U	U
Hexachloroethane	1.9	190	U	NA	NA	NA	U	U	U	U	U	U	U	U
Indeno(1,2,3-cd)pyrene	4.4	430	U	NA	NA	NA	4500 J	U	U	U	U	U	U	U
Isophorone	2.6	260	U	NA	NA	NA	U	U	U	U	U	U	U	U
Naphthalene	1.9	190	U	NA	NA	NA	U	U	U	U	U	U	U	U
Nitrobenzene	2.3	220	U	NA	NA	NA	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
N-Nitroso-dimethylamine	12	1200	U	NA	NA	NA	U	U	U	U	U	U	U	U
N-Nitroso-di-n-propylamine	12	1200	U	NA	NA	NA	U	U	U	U	U	U	U	U
N-Nitroso-diphenylamine	2.3	220	U	NA	NA	NA	U	U	U	U	U	U	U	U
Phenanthrene	6.4	630	U	NA	NA	NA	10100	BMDL	2800 J	U	1400 J	1600 J	U	4200 J
Pyrene	2.3	220	U	NA	NA	NA	12400	BMDL	2350 J	2200 J	1400 J	1600 J	U	5970
1,2,4-Trichlorobenzene	2.3	220	U	NA	NA	NA	U	U	U	U	U	U	U	U

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number Laboratory Sample Number Sampling Date Units	Quant Limit ug/L	Quant Limit ug/Kg	SWFB01 HA6706 11/14/91 ug/L	SEDFB01 HA6683 11/14/91 ug/L	TB111491 HA6709 11/14/91 ug/L	TB111501 HA6684 11/15/91 ug/L	B S-1 HA6678 11/13/91 ug/Kg	B S-2 HA6680 11/15/91 ug/Kg	B S-3 HA6677 11/14/91 ug/Kg	B S-4 HA6676 11/14/91 ug/Kg	B S-5 HA6675 11/14/91 ug/Kg	B S-7 HA6673 11/13/91 ug/Kg	B S-9 HA6674 11/13/91 ug/Kg	B S-10 HA6679 11/13/91 ug/Kg
INORGANIC PARAMETERS														
Antimony	60	6000	U	U	NA	NA	U	U	BMDL	BMDL	12000	U	U	BMDL
Arsenic	100	1000	U	U	NA	NA	16000	14000 J	13000	14000	8100	11000 J	17000 J	32000 J
Barium	20	2000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Beryllium	1.0	100	U	U	NA	NA	1100	1200	570	1600	1600	610	560	1100
Cadmium	3.0	200	U	U	NA	NA	3600	6600	3100	4500	6200	2500	2200	4900
Chromium	10	1000	U	U	NA	NA	50000	198000	25000	100000	60000	30000	13000	21000
Cobalt	20	2000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper	10	1000	U	U	NA	NA	35000	22000	27000	24000	27000	27000	65000	60000
Lead	5.0	500	U	U	NA	NA	72000	48000	80000	33000	37000	50000	120000	400000
Mercury	0.20	80	U	U	NA	NA	U	BMDL	U	U	U	U	BMDL	150
Nickel	20	1000	U	U	NA	NA	16000	12000	14000	18000	18000	15000	12000	16000
Selenium	5.0	500	UJ	BMDL	NA	NA	UJ	UJ	BMDL JB	BMDL JB	BMDL JB	U	BMDL JB	U
Silver	10	1000	U	U	NA	NA	BMDL B	BMDL B	BMDL J	BMDL J	BMDL J	BMDL B	BMDL B	BMDL B
Thallium	10	1000	U	UJ	NA	NA	BMDL	BMDL	BMDL	BMDL	BMDL	BMDL	BMDL	BMDL
Tin	50	5000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vadadium	20	2000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	20	2000	U	U	NA	NA	97000	74000	150000	140000	140000	82000	120000	499000

LEGEND:

- U Compound was not detected at laboratory method detection limit.
  - J Estimated value due to limitations identified during the quality assurance review.
  - UJ eported method detection limit is estimated due to limitations identified during the quality assurance review.
  - B Compound was detected in a laboratory and/or field blank at similar concentrations. May represent laboratory and/or field contamination.
  - R Unreliable result. Compound may or may not be present.
  - \* Sample analyzed at multiple dilutions. Summary table is a hybrid of diluted and undiluted results.
  - No standard available. Compound was qualitatively searched for.
  - IND Indeterminate. Standard and/or spikes could not be detected at method detection limit.
  - BMDL Below Method Detection Limit reported by laboratory.
- Discrepancies may exist between the laboratory data tables and the data validation summary tables due to variations in the rounding of calculations.



**DATA VALIDATION/QUALITY ASSURANCE REVIEW  
PHASE II RCRA FACILITY INVESTIGATION  
CHEM WASTE MANAGEMENT, INC. - CHICAGO INCINERATOR  
SAMPLE COLLECTION DATES: NOVEMBER 19 AND 20, 1991  
DAMES & MOORE JOB NO.: 13963-055-192**

**LABORATORY REPORT Nos.: 101435 & 101440**

**INTRODUCTION**

One (1) groundwater sample, sixteen (16) soil samples, plus two (2) soil field-duplicate samples and two (2) trip-blank samples were collected and submitted to Environmental Testing Corporation (ETC) of Edison, New Jersey (1992 Illinois Certification No. 100224). All samples included in this review are listed on Table 1. The groundwater sample was analyzed for RCRA Appendix IX heated purge and trap volatile organic compounds (HP/T VOA), purge and trap volatile organic compounds (P/T VOA), semivolatile organic compounds (base/neutral and acid-extractable organic compounds) and metals. The soil samples were analyzed for priority pollutant volatile organic compounds, semivolatile organic compounds and metals. The two (2) trip-blank samples were analyzed for priority pollutant volatile organic compounds only. All samples were analyzed following USEPA SW-846 Methodologies.

A data validation review was performed on all samples prepared under a modified CLP-SOW 3/90 CLP-I data deliverable format. Data were examined to assess the usability of the results, as well as to assess compliance relative to data package deliverable requirements. The organic data review is based upon a rigorous review of the reported hold times, surrogate recoveries, blank spike recoveries, matrix spike and matrix spike duplicate summaries, blank contaminants, internal standard area performance, Gas Chromatography/Mass Spectroscopy (GC/MS) tuning and calibration data.

The inorganic data review is based on a review of the reported hold times, blank analysis results, blank spike recoveries, matrix spike and duplicate results, calibration results, post-digestion spike recoveries and Inductively Coupled Plasma (ICP) serial dilution analysis.

Details of the data validation/quality assurance review are presented in the narrative section of the report. The data is summarized in Table 2 of the report. Data qualifiers have been placed next to the results so that the data user can quickly assess the qualitative and/or quantitative reliability of the reported result. This report was prepared to provide a critical review of the laboratory analysis and reported chemical results. Quality assurance reviews of laboratory-generated data routinely identify problems associated with analytical measurements, even from the most experienced and capable laboratories.

This review has been performed in accordance with the requirements specified in the "Laboratory Data Validation Functional Guidelines for Evaluating Organic Analyses" dated February 1988 and "Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses" dated July 1988.

**TABLE 1**  
**SAMPLES INCLUDED IN REVIEW**

<u>Sample ID</u>	<u>Lab ID</u>	<u>Date Collected</u>	<u>Test Requested</u>
<u>Laboratory Report No. 101435</u>			
FG-6GW	HA6542	11/19/91	RCRA Appendix IX HP/T VOA, P/T VOA, BNA & Metals
SS-17	HA6801	11/19/91	PP VOA, PP BNA & PP Metals
SS-4	HA6802	11/19/91	PP VOA, PP BNA & PP Metals
SSDUP01	HA6803	11/19/91	PP VOA, PP BNA & PP Metals
SS-16	HA6804	11/19/91	PP VOA, PP BNA & PP Metals
SS-1	HA6805	11/19/91	PP VOA, PP BNA & PP Metals
SS-2	HA6806	11/19/91	PP VOA, PP BNA & PP Metals
TB111991	HA6826	11/19/91	PP VOA
<u>Laboratory Report No. 101440</u>			
SS-14	HA6807	11/20/91	PP VOA, PP BNA & PP Metals
SS-15	HA6808	11/20/91	PP VOA, PP BNA & PP Metals
SS-3	HA6809	11/20/91	PP VOA, PP BNA & PP Metals
SS-23	HA6810	11/20/91	PP VOA, PP BNA & PP Metals
SS-22	HA6811	11/20/91	PP VOA, PP BNA & PP Metals
SSDUP02	HA6812	11/20/91	PP VOA, PP BNA & PP Metals
SS-5	HA6813	11/20/91	PP VOA, PP BNA & PP Metals
SS-20	HA6814	11/20/91	PP VOA, PP BNA & PP Metals
SS-21	HA6815	11/20/91	PP VOA, PP BNA & PP Metals
SS-6	HA6819	11/20/91	PP VOA, PP BNA & PP Metals
SS-10	HA6820	11/20/91	PP VOA, PP BNA & PP Metals
SS-7	HA6821	11/20/91	PP VOA, PP BNA & PP Metals
TB112091	HA6827	11/19/91	PP VOA

Legend:

HP/T VOA	=	RCRA Appendix IX Heated Purge and Trap Volatile Organic Compounds
P/T VOA	=	RCRA Appendix IX Purge and Trap Volatile Organic Compounds
BNA	=	RCRA Appendix IX Semivolatile Organic Compounds (Base/Neutral and Acid-Extractable Organic Compounds)
PP VOA	=	Priority Pollutant Volatile Organic Compounds
PP BNA	=	Priority Pollutant Semivolatile Organic Compounds (Base/Neutral and Acid-Extractable Organic Compounds)
PP Metals	=	Priority Pollutant Metals

## GENERAL COMMENTS

With regard to the data package deliverables, most of the requirements were met with the exception of the metals and semivolatile fractions.

- This reviewer has observed that for the ICP concentrations reported at 10 to 15 times above the method detection limit (MDL), the data validation cannot reproduce the laboratory reported results. The calculation obtained during data validation is consistently higher than the laboratory reported concentration. This is due to the fact that the interelement correction factors in the ICP instrument have been externally calculated in the system. Since this external interelement correction factor is not available for review, the reported results for low level samples cannot be reproduced. It should be noted that positive ICP reported results that are significantly above than the MDL (approximately 100 times higher or more) were reproduced and validated, since this interelement correction factor becomes negligible at higher concentrations. The data review assumes that the low level reported concentrations (10 to 15 times the MDL) are correct as reported and it is this reviewer's opinion that data usability is not impacted.
- Sample FG-6GW was reanalyzed at a 1:20 dilution for semivolatile analysis due to acid-extractable target compound concentrations exceeding the linear calibration range requirements. On the result summary pages, however, the laboratory reported the undiluted results which are regarded as estimated values for this sample. For the acid-extractable compounds, 2,4-dichlorophenol, 2,6-dichlorophenol and phenol, the results should have been reported from the 1:20 dilution analysis. This reviewer has corrected this error on Table 2 of the report.

## DATA QUALIFIERS

Overall, the data quality is good. The data validation review has identified aspects of the analytical data that require qualification. To confidently use any of the data within the data set, the data user should understand the limitations and qualifications presented. With regard to data usability, the following qualifiers are offered based upon the data provided.



## ORGANIC QUALIFIERS

### Hold Times:

- All samples were analyzed and/or extracted within the required hold time criteria for all organic parameters.

### Blank Contamination:

- Due to the presence of di-n-butyl phthalate in the semivolatile laboratory blank associated with the soil samples, the positive di-n-butyl phthalate results are qualitatively questionable and have been flagged (B) on the summary tables.

### Surrogate Recoveries:

- The volatile surrogate, toluene-d8, was recovered outside the control limits (high) for the soil samples SS-23 and SSDUP02. The positive results may be biased high and have been flagged (J) estimated.
- Two volatile surrogates, toluene-d8 (high) and bromofluorobenzene (low), were recovered outside the control limits for the soil samples SS-21 and SS-10. Due to the variability of the surrogate recoveries, the positive and non-detected results have been flagged (J/UJ) estimated on the summary tables.
- The base/neutral surrogate, 2-fluorobiphenyl, was recovered outside the control limits (low) for the groundwater sample FG-6GW. Additionally, the acid-extractable surrogate, 2-fluorophenol, was recovered less than 10% for this sample. The positive and non-detected base/neutral results for this sample may be biased low and have been flagged (J/UJ) estimated. The positive acid-extractable results may also be biased low and have been flagged (J) estimated. The non-detected acid-extractable results, however, are regarded as unreliable and have been flagged (R) on the summary tables. It should be noted that all surrogate recoveries in the 1:20 dilution analysis of sample FG-6GW were all within the control limits. Therefore, there is no impact on the data quality of the acid-extractable compounds reported from this dilution analysis and no qualifier has been applied.
- The base/neutral surrogate, 2-fluorobiphenyl, was recovered outside the control limits (high) for samples SSDUP01, SS-1, SS-23, SS-22, SS-21, SS-6, SS-10 and SS-7 and may be biased high. No qualifier has been applied.

to these samples since only one surrogate per sample is outside the control limits.

#### Internal Standards:

- The area counts of the volatile internal standards, chlorobenzene-d5, for the soil samples SS-23, SSDUP02, SS-21, SS-10 and SS-7, and the internal standard, 1,4-difluorobenzene-d4, for samples SS-2 and SS-7, were outside the control limits (low). The positive and non-detected results quantitated against these internal standards are regarded as estimated values and have been flagged (J/UJ) on the summary tables.
- The area counts of the semivolatile internal standards, chrysene-d12 and perylene-d12, were outside the control limits (high) for the groundwater sample FG-6GW. The base/neutral results of this sample have been qualified based on the aforementioned assessment of the surrogate recoveries.

#### Matrix Spike and Matrix Spike Duplicate Summary (MS/MSD):

- The heated purge and trap volatile (HP/T VOA) blank spike recoveries of acetonitrile, acrylonitrile, 1,4-dioxane and isobutyl alcohol, associated with the groundwater sample FG-6GW, were outside the control limits (low). The positive and non-detected results may be biased low and have been flagged (J/UJ) estimated.
- The HP/T VOA blank spiking compound, acrolein, associated with the groundwater sample FG-6GW, was recovered less than 10%. The non-detected acrolein result is regarded as unreliable (compound may or may not be present) and has been flagged (R) on Table 2.
- The purge and trap volatile (P/T VOA) blank spike recovery of 3-chloropropene, associated with the groundwater sample FG-GW, was outside the control limits (low). The non-detected result of this compound is regarded as an estimated value and has been flagged (UJ) on Table 2.
- The acid-extractable matrix spiking compound, phenol, was recovered outside the control limits (high) for sample FG-6GWMS/MSD. The positive results in the unspiked sample may be biased high and have been flagged estimated (J) for the unspiked sample on Table 2.
- The base/neutral blank spike recovery of dimethyl phthalate, associated with the groundwater sample FG-6GW, was recovered less than 10%.

The non-detected result of this compound for the sample is regarded as unreliable (compound may or may not be present) and has been flagged (R) on the summary table.

- Due to the low base/neutral blank spike recoveries of 3,3'-dichlorobenzidine and N-nitroso-di-n-propylamine associated with all soil samples, the positive and non-detected results are regarded as estimated values and have been flagged (J/UJ) on the summary tables.
- Sample SSDUP02 was collected and submitted to the laboratory as a blind field volatile duplicate of sample SS-17. The reproducibility of the volatile compound results are good, providing a positive indication of the field techniques and laboratory precision associated with the samples.
- Sample SSDUP01 was collected and submitted to the laboratory as a blind field semivolatile duplicate of sample SS-22. The reproducibility of the acid-extractable compounds are good. For the base/neutral compounds, however, it appears that the laboratory may have inadvertently switched these two samples. The positive results identified in sample SS-22 are similar in concentration to sample SSDUP01 and the positive results identified in sample SS-17 appear to closely match SSDUP01. The positive base/neutral results for both pairs of field duplicates are regarded as estimated values and have been flagged (J) on Table 2.

#### Initial and Continuing Calibrations:

- The groundwater sample FG-6GW was analyzed for P/T VOA at a 1:250 dilution due to acetone concentration exceeding the linear calibration range requirements.
- Due to the high difference between the initial and continuing calibrations response factors (%D >25 and <90%), all positive results for the following volatile compounds have been flagged (J) estimated. The actual detection limits may be higher than reported and have been flagged (UJ) estimated on the summary table.

<u>Compound</u>	<u>Log Link</u>	<u>Associated Sample</u>
Methyl Bromide Chlorodibromomethane, 2-Chloroethylvinyl ether, 1,1,2,2-Tetrachloroethane & Bromoform	101440	SS-23, SS-22, SSDUP02, SS-5, SS-20, SS-21, SS-6 SS-10 & SS-7

- The percent difference between the initial and continuing calibration response factors of the following organic compounds were greater than 90%. The positive results of the following samples have been flagged (J) estimated. The non-detected results are regarded as unreliable and have been flagged (R) on the summary table.

<u>Compound</u>	<u>Fraction</u>	<u>Associated Sample</u>
2,4-Dinitrophenol	BNA	FG-6GW
Methyl Chloride, Dichlorofluoromethane & Vinyl Chloride	VOA	SS-23, SS-22, SSDUP02, SS-5, SS-20, SS-21, SS-6, SS-10 & SS-7

- The response factor for the volatile compound, methyl ethyl ketone (MEK) is less than 0.05 in the continuing calibration associated with groundwater sample FG-6GW. The non-detected MEK results are regarded as unusable and have been flagged (R) on the summary table.

#### Additional Comments:

- As per the requirements, all values calculated below the method detection limit should be considered estimated and have been flagged (J) on the data table.

### INORGANIC PARAMETER QUALIFIERS

#### Hold Times:

- All samples were digested and analyzed within the required hold time criteria for priority pollutant metals analyses.

#### Blank Contamination:

- No blank contaminants have been identified that require qualification on the metal analytes for the samples reviewed.

#### Instrument Calibration and Verification:

- The initial and continuing calibration verification recoveries of all metals were reported within control limits.

#### ICP Serial Dilution Results:

- The ICP serial dilution of cadmium, chromium, lead and zinc associated with the analysis of the soil sample SS-5, were outside the control limits. The positive results of these analytes for this soil sample are regarded as estimated values and have been flagged (J) on the summary table.
- The ICP serial dilution of chromium, nickel, lead and zinc associated with the analysis of the soil sample SS-7, were outside the control limits. The positive results of these analytes for this soil sample are regarded as estimated values and have been flagged (J) on Table 2.

#### Matrix Spike and Duplicate Summary:

- The blank spike recovery of silver, associated with the soil samples SS-14, SS-15, SS-3, SS-23, SS-22, SSDUP02, SS-5, SS-20, SS-21, SS-6 and SS-7, was outside the control limits (low). The positive and non-detected results of silver in the aforementioned soil samples may be biased low and have been flagged (J/UJ) estimated on the summary tables.
- Due to the low matrix spike recoveries of nickel, antimony and selenium in sample SS-5MS, and lead, antimony and selenium in sample SS-7MS, the positive and non-detected results of these analytes in the unspiked samples may be biased low have been flagged (J/UJ) estimated.
- Due to the high relative percent differences (RPD) associated with the duplicate analysis of cadmium in sample SS-5D, the positive cadmium result in sample SS-5D has been flagged (J) estimated.
- The soil samples SSDUP01 and SSDUP02 were collected and submitted to the laboratory as blind field-duplicates of samples SS-17 and SS-22 respectively. The reproducibility of the metals results are good, providing a positive indication of the field techniques and laboratory precision associated with the samples.

#### Post-Digestion Spike Recoveries:

- The post-spike recoveries of the following analytes fell outside the control limits (low). Positive and/or non-detected results of these analytes for the associated samples may be biased low and have been flagged (J) estimated on Table 2.

<u>Analyte</u>	<u>Log Link</u>	<u>Associated Sample</u>
Arsenic	101435 101440	FG-6GW, SS-4, SS-16 & SS-2 SS-15
Selenium	101435 101440	SS-17, SS-4, SSDUP01, SS-16, SS-1 & SS-2 All Samples

**Additional Comments:**

- The laboratory reports several inorganic results as below the method detection limit (BMDL). These are reported as BMDL on Table 2. The actual concentrations are not calculated during the data validation review since the interelement coefficient factors were not provided.

TABLE 2  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number		FG-6GW
Laboratory Sample Number		HA6542
Sampling Date	Quant	11/19/91
Dilution Factor	Limit	1.0
Units	ug/L	ug/L
APPENDIX IX HEATED P/T VOLATILE COMPOUNDS		
Acetonitrile	15	U
Acrolein	20	U
Acrylonitrile	10	U
1,4-Dioxane	300	U
Ethyl cyanide	40	U
Isobutyl alcohol	230	U
Methacrylonitrile	110	U

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number	Quant	FG-06W
Laboratory Sample Number	Limit	HA0542
Sampling Date	ug/L	11/19/91
Dilution Factor		250
Units		ug/L
APPENDIX IX P/T VOLATILE COMPOUNDS		
Acetone	10	80700
Benzene	4.4	U
Bromoform	4.7	U
Carbon disulfide	10	U
Carbon Tetrachloride	2.8	U
Chlorobenzene	6.0	U
2-Chloro-1,3-butadiene	-	U
Chlorodibromomethane	3.1	U
Chloroethane	10	U
Chloroform	1.6	U
3-Chloropropene	10	UJ
Dichlorobromomethane	2.2	U
Dichlorodifluoromethane	10	U
1,2-Dibromo-3-chloropropane	10	U
1,2-Dibromoethane	10	U
1,4-Dichloro-2-butene	10	U
1,1-Dichloroethane	4.7	U
1,2-Dichloroethane	2.8	U
1,1-Dichloroethene	2.8	U
1,2-Dichloropropane	6.0	U
cis-1,3-Dichloropropene	5.0	U
trans-1,3-Dichloropropene	10	U
Ethylbenzene	7.2	U
Ethyl methacrylate	10	U
2-Hexanone	10	U
Iodomethane	10	U
Methyl bromide	10	U
Methyl chloride	10	U
Methylene Chloride	2.8	U
Methyl isobutyl ketone	10	U
Methyl ethyl ketone	10	R
Methyl methacrylate	10	U
Pentachloroethane	-	U
Styrene	10	U
1,1,2,2-Tetrachloroethane	4.1	U
Tetrachloroethene	4.1	U

continued next page (see last page of table for notes)



TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number		FG-6GW
Laboratory Sample Number		HA6542
Sampling Date	Quant	11/19/91
Dilution Factor	Limit	250
Units	ug/L	ug/L
APPENDIX IX P/T VOLATILE COMPOUNDS		
Toluene	6.0	U
1,2-Dichloroethene (trans)	1.6	U
1,1,1-Trichloroethane	3.8	U
1,1,2-Trichloroethane	5.0	U
1,2,3-Trichloropropane	10	U
Trichloroethene	1.9	U
Trichlorofluoromethane	10	U
Vinyl acetate	10	U
Vinyl Chloride	10	U
m-Xylene	10	U
o,p-Xylenes	10	U

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number Laboratory Sample Number Sampling Date Dilution Factor Units	Quant Limit ug/L	X FG-6GW HA6542 11/19/91 1.0/20 ug/L
APPENDIX IX SEMIVOLATILE COMPOUNDS		
Acetophenone	10	UJ
2-Acetylaminofluorene	10	UJ
4-Aminobiopheny	10	UJ
Aniline	10	UJ
Aramite	10	UJ
Benzo(A)anthracene	8.0	UJ
Benzo(b)fluoranthene	4.9	UJ
Benzo(a)pyrene	2.6	UJ
Bis(2-Chloroethoxy)methane	5.5	UJ
Bis(2-chloroethyl) ether	5.9	UJ
Bis(2-chloroisopropyl) ether	5.9	UJ
Bis(2-Ethylhexyl)phthalate	10	UJ
4-Bromophenylphenyl ether	2.0	UJ
Butylbenzylphthalate	10	UJ
2-sec-Butyl-4,6-dinitrophen	10	UJ
p-Chloraniline	10	UJ
p-Chloro-m-cresol	3.1	R
2-Chloranaphthalene	2.0	UJ
2-Chlorophenol	3.4	14.7 J
Chrysene	2.6	UJ
Acenaphthene	2.0	UJ
Acenaphthylene	3.6	UJ
Anthracene	2.0	UJ
Benzo(ghi)perylene	3.2	UJ
Benzo(k)fluoranthene	2.6	UJ
Fluorene	2.0	UJ
Phenanthrene	5.6	UJ
Pyrene	2.0	UJ
2-Nitrophenol	3.7	R
o-Cresol	10	5.4 J
m+p-Cresols	10	31.3 J
Diallate	10	UJ
Dibenzo(a,h)anthracene	2.6	UJ
Di-n-butyl phthalate	10	UJ
1,2-Dichlorobenzene	2.0	UJ
1,3-Dichlorobenzene	2.0	UJ
1,4-Dichlorobenzene	4.5	UJ
3,3-Dichlorobenzidine	17	UJ
2,4-Dichlorophenol	2.6	853 J*
2,6-Dichlorophenol	10	1200 J*

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number Laboratory Sample Number Sampling Date Dilution Factor Units	Quant Limit ug/L	X FG-6GW HA6542 11/19/91 1.0/20 ug/L
APPENDIX IX SEMIVOLATILE COMPOUNDS (continued)		
Diethylphthalate	10	UJ
p-Dimethylaminoazobenzene	10	UJ
7,12-Dimethylbenzo(a)anthra	10	UJ
3,3-Dimethylbenzidine	10	UJ
a-a-Dimethylphenethylamine	-	NA
2,4-Dimethylphenol	2.8	R
Dimethyl phthalate	10	R
m-Dinitrobenzene	10	UJ
4,6-Dinitro-o-cresol	25	R
2,4-Dinitrophenol	43	R
2,4-Dinitrotoluene	5.9	UJ
2,6-Dinitrotoluene	2.0	UJ
Di-n-octyl phthalate	10	UJ
Diphenylamine	10	UJ
N-nitrosodipropylamine	10	UJ
Ethyl methanesulfonate	10	UJ
Fluoranthene	2.3	UJ
Hexachlorobenzene	2.0	UJ
Hexachlorobutadiene	0.93	UJ
Hexachlorocyclopentadiene	10	UJ
Hexachloroethane	1.6	UJ
Isodrin	6.1	UJ
Hexachlorophene	10	UJ
Hexachloropropene	10	UJ
Indeno(1,2,3-c,d)pyrene	3.8	UJ
Isosafrole	10	UJ
Methapyrilene	-	IND
3-Methylcholanthrene	5.7	UJ
Methyl methanesulfonate	10	UJ
Naphthalene	1.6	UJ
1,4-Naphthoquinone	10	UJ
1-Naphthylamine	10	UJ
2-Naphthylamine	10	UJ
p-Nitroaniline	10	UJ
Nitrobenzene	2.0	UJ
4-Nitrophenol	2.5	R
4-Nitroquinoline-N-oxide	-	IND
N-Nitrosodiphenylamine	2.0	UJ
N-Nitrosodi-n-butylamine	10	UJ
N-Nitrosodiethylamine	10	UJ
N-Nitrosodimethylamine	10	UJ
N-Nitrosomethylethylamine	10	UJ

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number		X FG-6GW
Laboratory Sample Number		HA6542
Sampling Date	Quant	11/19/91
Dilution Factor	Limit	1.0/20
Units	ug/L	ug/L
APPENDIX IX SEMIVOLATILE COMPOUNDS (continued)		
N-Nitrosomorpholine	10	UJ
N-Nitrosopiperidine	10	UJ
N-Nitrosopyrrolidine	10	UJ
5-Nitro-o-toluidine	10	UJ
Pentachlorobenzene	10	UJ
Pentachloronitrobenzene	10	R
Pentachlorophenol	3.7	R
Phenacetin	10	UJ
Phenol	1.5	4900 J*
m-phenylenediamine	10	UJ
o-phenylenediamine	10	UJ
p-phenylenediamine	10	UJ
2-Picoline	10	UJ
Pronamide	10	UJ
Pyridine	10	UJ
Safrole	10	UJ
1,2,4,5-Tetrachlorobenzene	10	UJ
2,3,4,6-Tetrachlorophenol	10	R
Tetraethyldithiopyrophospha	-	UJ
o-Toluidine	10	UJ
1,2,4-Trichlorobenzene	2.0	UJ
2,4,5-Trichlorophenol	10	3.62 J
2,4,6-Trichlorophenol	2.8	UJ
0,0,0-Triethyl phosphorothi	-	NA
sym-Trinitrobenzene	-	IND
Benzyl alcohol	10	R
Dibenzofuran	10	UJ
Isophorone	2.3	R
2-Methylnaphthalene	10	UJ
o-Nitroaniline	10	UJ
m-Nitroaniline	10	UJ
4-Chlorophenyl phenyl ether	4.3	UJ

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number Laboratory Sample Number Sampling Date Units	Quant Limit ug/L	X FG-6GW HA6542 11/19/91 ug/Kg
APPENDIX IX INORGANIC PARAMETERS		
Aluminum	60	U
Arsenic	100	BMDL J
Barium	20	24
Beryllium	1.0	U
Cadmium	2.0	U
Chromium	10	12
Cobalt	20	U
Copper	10	BMDL J
Lead	5.0	BMDL J
Mercury	0.20	U
Nickel	20	200
Selenium	5.0	13
Silver	10	U
Thallium	10	U
Tin	50	U
Vanadium	20	280
Zinc	20	U

continued next page (see last page of table for notes)

**TABLE 2 (continued)**  
**SUMMARY OF ANALYTICAL RESULTS**  
**PHASE II INVESTIGATION**  
**CHEMICAL WASTE MANAGEMENT**  
**CHICAGO, ILLINOIS**

Dames and Moore Sample Number			SS-1	SS-2	SS-3	SS-4	SS-5	SS-6	SS-7	SS-10	SS-14	SS-15
Laboratory Sample Number			HA6805	HA6806	HA6809	HA6802	HA6813	HA6819	HA6821	HA6820	HA6807	HA6806
Sampling Date	Quant	Quant	11/19/93	11/19/93	11/20/93	11/19/93	11/20/93	11/20/93	11/20/93	11/20/93	11/20/93	11/20/93
Dilution Factor	Limit	Limit	1.2	1.2	1.2	1.3	1.2	1.4	1.6	1.3	1.2	1.1
Units	ug/L	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
<b>PRIORITY POLLUTANT P/T VOLATILE COMPOUNDS</b>												
Benzene	4.4	4.4	U	U	U	U	U	U	UJ	UJ	U	UJ
Bromoform	4.7	4.7	U	U	U	U	UJ	UJ	UJ	UJ	U	UJ
Carbon Tetrachloride	2.8	2.8	U	U	U	U	U	U	U	UJ	U	U
Chlorobenzene	6.0	6.0	U	U	U	U	U	U	UJ	UJ	U	U
Chlorodibromomethane	3.1	3.1	U	U	U	U	UJ	UJ	UJ	UJ	U	U
Chloroethane	10	10	U	U	U	U	U	U	U	UJ	U	U
2-Chloroethylvinyl ether	10	10	U	U	U	U	UJ	UJ	UJ	UJ	U	UJ
Chloroform	1.6	1.6	U	U	U	U	U	U	U	UJ	U	U
Dichlorobromomethane	2.2	2.2	U	U	U	U	U	U	UJ	UJ	U	UJ
Dichlorodifluoromethane	10	10	U	U	U	U	R	R	R	R	U	U
1,1-Dichloroethane	4.7	4.7	U	U	U	U	U	U	U	UJ	U	U
1,2-Dichloroethane	2.8	2.8	U	U	U	U	U	U	U	UJ	U	U
1,1-Dichloroethene	2.8	2.8	U	U	18.5	U	U	U	U	UJ	U	14.3
1,2-Dichloropropane	6.0	6.0	U	U	U	U	U	U	UJ	UJ	U	UJ
cis-1,3-Dichloropropene	5.0	5.0	U	U	U	U	U	U	UJ	UJ	U	U
trans-1,3-Dichloropropene	10	10	U	U	U	U	U	U	UJ	UJ	U	U
Ethylbenzene	7.2	7.2	U	U	U	U	UJ	UJ	UJ	UJ	U	U
Methyl bromide	10	10	U	U	U	U	R	R	R	R	U	U
Methyl chloride	10	10	U	U	U	U	U	U	U	UJ	U	U
Methylene Chloride	2.8	2.8	U	U	U	U	UJ	UJ	UJ	UJ	U	U
1,1,2,2-Tetrachloroethane	4.1	4.1	U	U	U	U	U	U	UJ	UJ	U	U
Tetrachloroethene	4.1	4.1	U	U	U	U	U	U	UJ	UJ	U	U
Toluene	6.0	6.0	U	U	U	U	U	U	U	UJ	U	U
1,2-Dichloroethene (trans)	1.6	1.6	U	U	U	U	U	U	UJ	UJ	U	UJ
1,1,1-Trichloroethane	3.8	3.8	U	U	U	U	U	U	UJ	UJ	U	UJ
1,1,2-Trichloroethane	5.0	5.0	U	U	U	U	U	U	UJ	UJ	U	UJ
Trichloroethene	1.9	1.9	U	U	1.98 J	U	U	U	U	3.7 J	U	U
Trichlorofluoromethane	10	10	U	U	U	U	R	R	R	R	U	U
Vinyl Chloride	10	10	U	U	U	U	U	U	U	UJ	U	U

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number			SS-1	SS-2	SS-3	SS-4	SS-5	SS-6	SS-7	SS-10	SS-14	SS-15
Laboratory Sample Number			HA6805	HA6806	HA6809	HA6802	HA6813	HA6819	HA6821	HA6820	HA6807	HA6806
Sampling Date	Quant	Quant	11/19/93	11/19/93	11/20/93	11/19/93	11/20/93	11/20/93	11/20/93	11/20/93	11/20/93	11/20/93
Dilution Factor	Limit	Limit	11.1	1.2	1.2	1.3	1.2	11.8	13.6	10.9	1.2	1.1
Units	ug/L	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
ACID EXTRACTABLE COMPOUNDS												
2-Chlorophenol	3.9	340	U	U	U	U	U	U	U	U	U	U
2,4-Dichlorophenol	3.2	280	U	U	U	U	U	U	U	U	U	U
2,4-Dimethylphenol	3.2	280	U	U	U	U	U	U	U	U	U	U
4,6-Dinitro-2-methylphenol	29	2400	U	U	U	U	U	U	U	U	U	U
2,4-Dinitrophenol	50	4300	U	U	U	U	U	U	U	U	U	U
2-Nitrophenol	4.3	370	U	U	U	U	U	U	U	U	U	U
4-Nitrophenol	2.9	240	U	U	U	U	U	U	U	U	U	U
4-Chloro-3-methylphenol	3.6	310	U	U	U	U	U	U	U	U	U	U
Pentachlorophenol	4.3	370	U	U	U	U	U	U	U	U	U	U
Phenol	1.8	150	U	U	U	U	U	U	U	U	U	U
2,4,6-Trichlorophenol	3.2	280	U	U	U	U	U	U	U	U	U	U

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number	Quant	Quant	SS-1	SS-2	SS-3	SS-4	SS-5	SS-6	SS-7	SS-10	SS-14	SS-15
Laboratory Sample Number	Limit	Limit	HA6805	HA6806	HA6809	HA6802	HA6813	HA6819	HA6821	HA6820	HA6807	HA6808
Sampling Date	ug/L	ug/Kg	11/19/93	11/19/93	11/20/93	11/19/93	11/20/93	11/20/93	11/20/93	11/20/93	11/20/93	11/20/93
Dilution Factor			10	1.2	1.2	1.3	1.2	11.8	13.6	10.9	1.2	1.1
Units	ug/L	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
PRIORITY POLLUTANT BASE/NEUTRAL EXTRACTABLE COMPOUNDS												
Acenaphthene	2.3	220	U	U	U	U	U	U	U	U	U	U
Acenaphthylene	4.2	410	U	U	U	U	U	U	U	U	U	U
Anthracene	2.3	220	U	U	U	U	188 J	U	U	U	U	U
Benzo(a)anthracene	9.3	910	1744 J	222 J	404 J	495 J	1020	U	U	U	195 J	U
Benzo(a)pyrene	3.0	290	U	U	305	463	998	U	U	U	U	U
Benzo(b)fluoranthene	5.7	560	U	255 J	606	916	1240	U	U	U	U	251 J
Benzo(g,h,i)perylene	4.9	480	U	U	U	U	U	U	U	U	U	U
Benzo(k)fluoranthene	3.0	290	U	U	314	386	762	U	U	U	U	U
bis(2-Chloroethoxy)methane	6.3	620	U	U	U	U	U	U	U	U	U	U
Bis(2-chloroethyl) ether	6.8	660	U	U	U	U	U	U	U	U	U	U
bis(2-chloroisopropyl)ether	6.8	660	U	U	U	U	U	U	U	U	U	U
bis(2-Ethylhexyl)phthalate	12	1200	U	335 J	276 J	U	302 J	U	U	U	325 J	295 J
4-Bromophenylphenyl ether	2.3	220	U	U	U	U	U	U	U	U	U	U
Butylbenzylphthalate	12	1200	U	U	U	U	U	U	U	U	6830	U
2-Chloronaphthalene	2.3	220	U	U	U	U	U	U	U	U	U	U
4-Chlorophenylphenyl ether	5.0	490	U	U	U	U	U	U	U	U	U	U
Chrysene	3.0	290	1733 J	303	524	620	1250	2360 J	U	U	264 J	219 J
Dibenz(a,h)anthracene	3.0	290	U	U	U	U	U	U	U	U	U	U
1,2-Dichlorobenzene	2.3	220	U	U	U	U	U	U	U	U	U	U
1,3-Dichlorobenzene	2.3	220	U	U	U	U	U	U	U	U	U	U
1,4-Dichlorobenzene	5.2	510	U	U	U	U	U	U	U	U	U	U
3,3'-Dichlorobenzidine	19.6	1920	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Diethylphthalate	12	1200	U	U	U	U	U	U	U	U	U	U
Dimethylphthalate	12	1200	U	U	U	U	U	U	U	U	U	214 J
Di-n-butylphthalate	12	1200	3209 J	1680 B	2020 B	4000 B	1530 B	U	2440 JB	U	1130 JB	1750 B
2,4-Dinitrotoluene	6.8	660	U	U	U	U	U	U	U	U	U	U
2,6-Dinitrotoluene	2.3	220	U	U	U	U	U	U	U	U	U	U
Di-n-octylphthalate	12	1200	U	U	U	U	U	U	U	U	U	U
Fluoranthene	2.6	260	2910	373	833	804	1960	4120	2640 J	1740 J	354	244 J
Fluorene	2.3	220	U	U	U	U	U	U	U	U	U	U
Hexachlorobenzene	2.3	220	U	U	U	U	275	U	U	3100	U	U
Hexachlorobutadiene	1.1	100	U	U	U	U	U	U	U	U	U	U
Hexachlorocyclopentadiene	12	1200	U	U	U	U	U	U	U	U	U	U
Hexachloroethane	1.9	190	U	U	U	U	U	U	U	U	U	U
Indeno(1,2,3-cd)pyrene	4.4	430	U	U	U	U	529	U	U	U	U	U
Isophorone	2.6	260	U	U	U	U	U	U	U	U	U	U
Naphthalene	1.9	190	U	U	U	U	U	U	U	U	U	U
Nitrobenzene	2.3	220	U	U	U	U	U	U	U	U	U	U
N-Nitroso-dimethylamine	12	1200	U	U	U	U	U	U	U	U	U	U
N-Nitroso-di-n-propylamine	12	1200	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
N-Nitroso-diphenylamine	2.3	220	U	U	U	U	U	U	U	U	U	U
Phenanthrene	6.4	630	1910 J	289 J	1330	398 J	1020	3180 J	2400 J	U	194 J	124 J
Pyrene	2.3	220	2480	351	1010	769	2010	3410	2200 J	2050 J	332	211 J
1,2,4-Trichlorobenzene	2.3	220	U	U	U	U	U	U	U	U	U	U

continued next page (see last page of table for notes)



**TABLE 2 (continued)**  
**SUMMARY OF ANALYTICAL RESULTS**  
**PHASE II INVESTIGATION**  
**CHEMICAL WASTE MANAGEMENT**  
**CHICAGO, ILLINOIS**

Dames and Moore Sample Number	Quant	Quant	SS-1	SS-2	SS-3	SS-4	SS-5	SS-6	SS-7	SS-10	SS-14	SS-15
Laboratory Sample Number	Limit	Limit	HA6805	HA6806	HA6809	HA6802	HA6813	HA6819	HA6821	HA6820	HA6807	HA6808
Sampling Date	ug/L	ug/Kg	11/19/93	11/19/93	11/20/93	11/19/93	11/20/93	11/20/93	11/20/93	11/20/93	11/20/93	11/20/93
Units			ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
<b>PRIORITY POLLUTANT INORGANIC PARAMETERS (METALS)</b>												
Antimony	60	6000	BMDL J	BMDL J	23000 J	BMDL J	22000 J	9500 J	BMDL J	UJ	19000 J	22000 J
Arsenic	100	1000	5900	BMDL J	2600	BMDL J	2500	7200	30000	5400	2100	BMDL J
Beryllium	1.0	100	1200	2000	1300	1600	1300	1500	990	1900	1300	1400
Cadmium	2.0	200	4000 J	13000 J	12000	12000 J	12000 J	4700	4200	1700	12000	10000
Chromium	10	1000	110000 J	968000 J	1060000 J	1320000 J	740000 J	184000 J	92000 J	27000 J	864000 J	1060000 J
Copper	10	1000	43000	32000	36000	52000	44000	49000	60000	23000	38000	35000
Lead	5.0	500	120000 J	39000 J	43000 J	32000 J	92000 J	260000 J	200000 J	44000 J	48000 J	41000 J
Mercury	0.20	80	120	110	BMDL J	BMDL J	110	150	260	110	120	120
Nickel	20	1000	20000 J	12000 J	26000 J	12000 J	14000 J	24000 J	32000 J	17000 J	11000 J	140000 J
Selenium	5.0	500	BMDL J	UJ	BMDL J	UJ	UJ	BMDL J	BMDL J	BMDL J	BMDL J	UJ
Silver	10	1000	1200	3500	3300 J	3000	2400 J	BMDL J	BMDL J	BMDL J	2700 J	3400 J
Thallium	10	1000	BMDL J	U	U	U	U	BMDL J	BMDL J	BMDL J	U	U
Zinc	20	2000	251000 J	67000 J	81000 J	67000 J	110000 J	481000 J	220000 J	81000 J	92000 J	100000 J

**LEGEND:**

- U Compound was not detected at laboratory method detection limit.
  - J Estimated value due to limitations identified during the quality assurance review.
  - UJ Reported method detection limit is estimated due to limitations identified during the quality assurance review.
  - B Compound was detected in a laboratory and/or field blank at similar concentrations. May represent laboratory and/or field contamination.
  - R Unreliable result. Compound may or may not be present.
  - \* Sample analyzed at multiple dilutions. Summary table is a hybrid of diluted and undiluted results.
  - No standard available. Compound was qualitatively searched for.
  - IND Indeterminate. Standard and/or spikes could not be detected at method detection limit.
  - BMDL Below Method Detection Limit reported by laboratory.
- Discrepancies may exist between the laboratory data tables and the data validation summary tables due to variations in the rounding of calculations.

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number			SS-16	SS-17	SSDUP01	SS-20	SS-21	SS-22	SSDUP02	SS-23	TB-111991	TB-112091
Laboratory Sample Number			HA6804	HA6801	HA6803	HA6814	HA6815	HA6811	HA6812	HA610	HA6826	HA6826
Sampling Date	Quant	Quant	11/19/93	11/19/93	11/19/93	11/20/93	11/20/93	11/20/93	11/20/93	11/20/93	11/19/93	11/20/93
Dilution Factor	Limit	Limit	1.2	1.2	1.2	1.4	1.2	1.3	1.3	1.8	1.0	1.0
Units	ug/L	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/L	ug/L
PRIORITY POLLUTANT P/T VOLATILE COMPOUNDS												
Benzene	4.4	4.4	U	U	U	U	UJ	U	U	U	U	U
Bromoform	4.7	4.7	U	U	U	UJ	UJ	UJ	UJ	UJ	U	U
Carbon Tetrachloride	2.8	2.8	U	U	U	U	UJ	U	U	U	U	U
Chlorobenzene	6.0	6.0	U	U	U	U	UJ	U	UJ	3.5 J	U	U
Chlorodibromomethane	3.1	3.1	U	U	U	UJ	UJ	UJ	UJ	UJ	U	U
Chloroethane	10	10	U	U	U	U	UJ	U	U	U	U	U
2-Chloroethylvinyl ether	10	10	U	U	U	UJ	UJ	UJ	UJ	UJ	U	U
Chloroform	1.6	1.6	U	U	U	U	UJ	U	U	U	U	U
Dichlorobromomethane	2.2	2.2	U	U	U	U	UJ	U	U	U	U	U
Dichlorodifluoromethane	10	10	U	U	U	R	R	R	R	R	U	U
1,1-Dichloroethane	4.7	4.7	U	U	U	U	UJ	U	U	U	U	U
1,2-Dichloroethane	2.8	2.8	U	U	U	U	UJ	U	U	U	U	U
1,1-Dichloroethene	2.8	2.8	U	U	U	U	UJ	U	U	U	U	U
1,2-Dichloropropane	6.0	6.0	U	U	U	U	UJ	U	U	U	U	U
cis-1,3-Dichloropropene	5.0	5.0	U	U	U	U	UJ	U	U	UJ	U	U
trans-1,3-Dichloropropene	10	10	U	U	U	U	UJ	U	UJ	UJ	U	U
Ethylbenzene	7.2	7.2	U	U	U	UJ	UJ	UJ	UJ	R	U	U
Methyl bromide	10	10	U	U	U	R	R	R	R	U	U	U
Methyl chloride	10	10	U	U	U	U	UJ	U	U	U	U	U
Methylene Chloride	2.8	2.8	11	U	U	UJ	UJ	UJ	UJ	UJ	U	2.5 J
1,1,2,2-Tetrachloroethane	4.1	4.1	U	U	U	U	UJ	U	UJ	UJ	U	U
Tetrachloroethene	4.1	4.1	U	U	U	U	UJ	U	UJ	U	U	U
Toluene	6.0	6.0	U	U	U	U	UJ	U	U	3.4 J	U	U
1,2-Dichloroethene (trans)	1.6	1.6	U	U	U	U	UJ	U	U	U	U	U
1,1,1-Trichloroethane	3.8	3.8	U	U	U	U	UJ	U	U	U	U	U
1,1,2-Trichloroethane	5.0	5.0	U	U	U	U	UJ	U	U	U	U	U
Trichloroethene	1.9	1.9	U	U	U	U	UJ	U	U	U	U	U
Trichlorofluoromethane	10	10	U	U	U	R	R	R	R	R	U	U
Vinyl Chloride	10	10	U	U	U	U	UJ	U	U	U	U	U

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number			SS-16	SS-17	SSDUP01	SS-20	SS-21	SS-22	SSDUP02	SS-23	TB-111991	TB-112091
Laboratory Sample Number			HA6804	HA6801	HA6803	HA6814	HA6815	HA6811	HA6812	HA610	HA6826	HA6826
Sampling Date	Quant	Quant	11/19/93	11/19/93	11/19/93	11/20/93	11/20/93	11/20/93	11/20/93	11/20/93	11/19/93	11/20/93
Dilution Factor	Limit	Limit	1.2	1.2	10.5	1.2	10.5	11.4	1.3	15	1.0	1.0
Units	ug/L	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/L	ug/L
ACID EXTRACTABLE COMPOUNDS												
2-Chlorophenol	3.9	340	U	UJ	UJ	U	U	U	UJ	U	NA	NA
2,4-Dichlorophenol	3.2	280	U	UJ	UJ	U	U	U	UJ	U	NA	NA
2,4-Dimethylphenol	3.2	280	U	UJ	UJ	U	U	U	UJ	U	NA	NA
4,6-Dinitro-2-methylphenol	29	2400	U	UJ	UJ	U	U	U	UJ	U	NA	NA
2,4-Dinitrophenol	50	4300	U	UJ	UJ	U	U	U	UJ	U	NA	NA
2-Nitrophenol	4.3	370	U	UJ	UJ	U	U	U	UJ	U	NA	NA
4-Nitrophenol	2.9	240	U	UJ	UJ	U	U	U	UJ	U	NA	NA
4-Chloro-3-methylphenol	3.6	310	U	UJ	UJ	U	U	U	UJ	U	NA	NA
Pentachlorophenol	4.3	370	U	UJ	UJ	U	U	U	UJ	U	NA	NA
Phenol	1.8	150	U	UJ	UJ	U	U	U	UJ	U	NA	NA
2,4,6-Trichlorophenol	3.2	280	U	UJ	UJ	U	U	U	UJ	U	NA	NA

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number	Quant	Quant	SS-16	SS-17	SSDUP01	SS-20	SS-21	SS-22	SSDUP02	SS-23	TB-111991	TB-112091
Laboratory Sample Number	Limit	Limit	HA6804	HA6801	HA6803	HA6814	HA6815	HA6811	HA6812	HA610	HA6826	HA6826
Sampling Date	ug/L	ug/Kg	11/19/93	11/19/93	11/19/93	11/20/93	11/20/93	11/20/93	11/20/93	11/20/93	11/19/93	11/20/93
Dilution Factor			1.2	1.2	10.5	1.2	10.5	11.4	1.3	15	1.0	1.0
Units	ug/L	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/L	ug/L
PRIORITY POLLUTANT BASE/NEUTRAL EXTRACTABLE COMPOUNDS												
Acenaphthene	2.3	220	U	UJ	UJ	U	U	UJ	UJ	U	NA	NA
Acenaphthylene	4.2	410	U	UJ	UJ	U	U	UJ	UJ	U	NA	NA
Anthracene	2.3	220		200 J	UJ	U	U	UJ	UJ	U	NA	NA
Benzo(a)anthracene	9.3	910	261 J	1040 J	1720 J	U	U	2590 J	636 J	2650 J	NA	NA
Benzo(a)pyrene	3.0	290	328	1280 J	UJ	U	U	UJ	712 J	U	NA	NA
Benzo(b)fluoranthene	5.7	560	448 J	2450 J	3350 J	U	U	UJ	1380 J	U	NA	NA
Benzo(g,h,i)perylene	4.9	480	U	792 J	UJ	U	U	UJ	UJ	U	NA	NA
Benzo(k)fluoranthene	3.0	290	U	1090 J	UJ	U	U	UJ	580 J	U	NA	NA
bis(2-Chloroethoxy)methane	6.3	620	U	UJ	UJ	U	U	UJ	UJ	U	NA	NA
Bis(2-chloroethyl) ether	6.8	660	U	UJ	UJ	U	U	UJ	UJ	U	NA	NA
bis(2-chloroisopropyl)ether	6.8	660	U	UJ	UJ	U	U	UJ	UJ	U	NA	NA
bis(2-Ethylhexyl)phthalate	12	1200	329 J	UJ	UJ	U	U	404000 J	436 J	U	NA	NA
4-Bromophenylphenyl ether	2.3	220	U	UJ	UJ	U	U	UJ	UJ	U	NA	NA
Butylbenzylphthalate	12	1200	U	UJ	UJ	U	U	UJ	UJ	U	NA	NA
2-Chloronaphthalene	2.3	220	U	UJ	UJ	U	U	UJ	UJ	U	NA	NA
4-Chlorophenylphenyl ether	5.0	490	U	UJ	UJ	U	U	UJ	UJ	U	NA	NA
Chrysene	3.0	290	374	1230 J	2040 J	U	U	2800 J	791 J	3000 J	NA	NA
Dibenz(a,h)anthracene	3.0	290	U	UJ	UJ	U	U	UJ	UJ	U	NA	NA
1,2-Dichlorobenzene	2.3	220	U	UJ	UJ	U	U	UJ	UJ	U	NA	NA
1,3-Dichlorobenzene	2.3	220	U	UJ	UJ	U	U	UJ	UJ	U	NA	NA
1,4-Dichlorobenzene	5.2	510	U	UJ	UJ	U	U	UJ	UJ	U	NA	NA
3,3'-Dichlorobenzidine	19.6	1920	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	NA	NA
Diethylphthalate	12	1200	U	UJ	UJ	U	U	UJ	UJ	U	NA	NA
Dimethylphthalate	12	1200	U	UJ	UJ	U	U	UJ	UJ	U	NA	NA
Di-n-butylphthalate	12	1200	2120 B	1810 JB	1840 J	1340 J	U	3600 JB	1570 JB	3320 J	NA	NA
2,4-Dinitrotoluene	6.8	660	U	UJ	UJ	U	U	UJ	UJ	U	NA	NA
2,6-Dinitrotoluene	2.3	220	U	UJ	UJ	U	U	UJ	UJ	U	NA	NA
Di-n-octylphthalate	12	1200	U	UJ	UJ	U	U	UJ	UJ	U	NA	NA
Fluoranthene	2.6	260	489	1720 J	3050 J	U	BMDL J	5070 J	1010 J	6070	NA	NA
Fluorene	2.3	220	U	UJ	UJ	U	U	UJ	UJ	U	NA	NA
Hexachlorobenzene	2.3	220	U	UJ	UJ	U	U	UJ	UJ	U	NA	NA
Hexachlorobutadiene	1.1	100	U	UJ	UJ	U	U	UJ	UJ	U	NA	NA
Hexachlorocyclopentadiene	12	1200	U	UJ	UJ	U	U	UJ	UJ	U	NA	NA
Hexachloroethane	1.9	190	U	UJ	UJ	U	U	UJ	UJ	U	NA	NA
Indeno(1,2,3-cd)pyrene	4.4	430	U	914 J	UJ	U	U	UJ	UJ	U	NA	NA
Isophorone	2.6	260	U	UJ	UJ	U	U	UJ	UJ	U	NA	NA
Naphthalene	1.9	190	U	153 J	UJ	U	U	UJ	282 J	U	NA	NA
Nitrobenzene	2.3	220	U	UJ	UJ	U	U	UJ	UJ	U	NA	NA
N-Nitroso-dimethylamine	12	1200	U	UJ	UJ	U	U	UJ	UJ	U	NA	NA
N-Nitroso-di-n-propylamine	12	1200	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	NA	NA
N-Nitroso-diphenylamine	2.3	220	U	UJ	UJ	U	U	UJ	UJ	U	NA	NA
Phenanthrene	6.4	630	237 J	1010 J	1580 J	U	19105 J	5100 J	742 J	6120 J	NA	NA
Pyrene	2.3	220	425	1560 J	2640 J	U	2250 J	4000 J	1010 J	5180	NA	NA
1,2,4-Trichlorobenzene	2.3	220	U	UJ	UJ	U	U	UJ	UJ	U	NA	NA

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number	Quant	Quant	SS-16	SS-17	SSDUP01	SS-20	SS-21	SS-22	SDUP02	SS-23	TB-111991	TB-112091
Sample Depth	Limit	Limit	HA6804	HA6801	HA6803	HA6814	HA6815	HA6811	HA6812	HA6810	HA6826	HA6826
Laboratory Sample Number	ug/L	ug/Kg	11/19/93	11/19/93	11/19/93	11/20/93	11/20/93	11/20/93	11/20/93	11/20/93	11/19/93	11/20/93
Units			ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/L	ug/L
PRIORITY POLLUTANT INORGANIC PARAMETERS (METALS)												
Antimony	60	6000	UJ	BMDL J	BMDL J	BMDL J	BMDL J	90000 J	10000 J	BMDL J	NA	NA
Arsenic	100	1000	BMDL J	3700	6100	4400	BMDL J	4300	6000	9600	NA	NA
Beryllium	1.0	100	1500	3400	3400	360	270	690	690	2000	NA	NA
Cadmium	2.0	200	55700 J	3800 J	4500 J	1500	540	5000	5800	4300	NA	NA
Chromium	10	1000	600000 J	126000J	173000 J	8900 J	29000 J	157000 J	130000 J	57000 J	NA	NA
Copper	10	1000	78000	43000	39000	15000	16000	5400	42000	32000	NA	NA
Lead	5.0	500	68000 J	100000 J	94000 J	11000 J	45000 J	1260000 J	490000 J	270000 J	NA	NA
Mercury	0.20	80	U	150	190	U	250	130	180	230	NA	NA
Nickel	20	1000	71000 J	17000 J	15000 J	15000 J	7500 J	11000 J	13000 J	13000 J	NA	NA
Selenium	5.0	500	UJ	BMDL J	BMDL J	UJ	BMDL J	BMDL J	BMDL J	BMDL J	NA	NA
Silver	10	1000	3700	BMDL J	1300	BMDL J	BMDL J	BMDL J	1400 J	BMDL J	NA	NA
Thallium	10	1000	U	BMDL J	U	U	U	U	U	U	NA	NA
Zinc	20	2000	110000 J	220000 J	210000 J	40000 J	82000 J	1570000 J	1780000 J	744000	NA	NA

LEGEND:

- U Compound was not detected at laboratory method detection limit.
  - J Estimated value due to limitations identified during the quality assurance review.
  - UJ Reported method detection limit is estimated due to limitations identified during the quality assurance review.
  - B Compound was detected in a laboratory and/or field blank at similar concentrations. May represent laboratory and/or field contamination.
  - R Unreliable result. Compound may or may not be present.
  - \* Sample analyzed at multiple dilutions. Summary table is a hybrid of diluted and undiluted results.
  - No standard available. Compound was qualitatively searched for.
  - IND Indeterminate. Standard and/or spikes could not be detected at method detection limit.
  - BMDL Below Method Detection Limit reported by laboratory.
- Discrepancies may exist between the laboratory data tables and the data validation summary tables due to variations in the rounding of calculations.



**DATA VALIDATION/QUALITY ASSURANCE REVIEW  
PHASE II RCRA FACILITY INVESTIGATION  
CHEM WASTE MANAGEMENT, INC. - CHICAGO INCINERATOR  
SAMPLE COLLECTION DATES: NOVEMBER 19 - NOVEMBER 21, 1991  
DAMES & MOORE JOB NO.: 13963-055-192**

**LABORATORY REPORT No.: 101445**

**INTRODUCTION**

Seven (7) soil samples, one (1) groundwater sample and one (1) trip-blank sample were collected and submitted to Environmental Testing Corporation (ETC) of Edison, New Jersey (1992 Illinois Certification No. 100224). All samples included in this review are listed on Table 1. All soil samples were analyzed for priority pollutant volatile organic compounds, semivolatile organic compounds (base/neutral and acid-extractable organic compounds) and metals. The trip-blank sample was analyzed for priority pollutant volatile organics only. The groundwater sample was analyzed for RCRA Appendix IX heated purge and trap volatile organic compounds (HP/T VOA) and purge and trap volatile organic compounds (P/T VOA). All samples were analyzed following USEPA SW-846 Methodologies.

A data validation review was performed on all samples prepared under a modified CLP-SOW 3/90 CLP-I data deliverable format. Data were examined to assess the usability of the results, as well as to assess compliance relative to data package deliverable requirements. The organic data review is based upon a rigorous review of the reported hold times, surrogate recoveries, blank spike recoveries, matrix spike and matrix spike duplicate summaries, blank contaminants, internal standard area performance, Gas Chromatography/Mass Spectroscopy (GC/MS) tuning and calibration data.

The inorganic data review is based on a review of the reported hold times, blank analysis results, blank spike recoveries, matrix spike and duplicate results, calibration results, post-digestion spike recoveries and Inductively Coupled Plasma (ICP) serial dilution analysis.

Details of the data validation/quality assurance review are presented in the narrative section of the report. The data is summarized in Table 2 of the report. Data qualifiers have been placed next to the results so that the data user can quickly assess the qualitative and/or quantitative reliability of the reported result. This report was prepared to provide a critical review of the laboratory analysis and reported chemical results. Quality assurance reviews of laboratory-generated data routinely identify problems associated with analytical measurements, even from the most experienced and capable laboratories.

This review has been performed in accordance with the requirements specified in the "Laboratory Data Validation Functional Guidelines for Evaluating Organic Analyses" dated February 1988 and "Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses" dated July 1988.

**TABLE 1**  
**SAMPLES INCLUDED IN REVIEW**

<u>Sample ID</u>	<u>Lab ID</u>	<u>Date Collected</u>	<u>Test Requested</u>
<u>Laboratory Report No. 101445</u>			
FG-11GW	HA6541	11/19/91	RCRA Appendix IX HP/T VOA & P/T VOA
SS-11	HA6816	11/21/91	PP VOA, PP BNA & PP Metals
SS-12	HA6817	11/21/91	PP VOA, PP BNA & PP Metals
SS-13	HA6818	11/21/91	PP VOA, PP BNA & PP Metals
SS-18	HA6822	11/21/91	PP VOA, PP BNA & PP Metals
SS-19	HA6823	11/21/91	PP VOA, PP BNA & PP Metals
SS-8	HA6824	11/21/91	PP VOA, PP BNA & PP Metals
SS-9	HA6825	11/21/91	PP VOA, PP BNA & PP Metals
TB121991	HA6828	11/21/91	PP VOA

**Legend:**

HP/T VOA	=	RCRA Appendix IX Heated Purge and Trap Volatile Organic Compounds
P/T VOA	=	RCRA Appendix IX Purge and Trap Volatile Organic Compounds
PP VOA	=	Priority Pollutant Volatile Organic Compounds
PP BNA	=	Priority Pollutant Semivolatile Organic Compounds (Base/Neutral and Acid Extractable Organic Compounds
PP Metals	=	Priority Pollutant Metals

**GENERAL COMMENTS**

With regard to the data package deliverables, most of the requirements were met with the exception of the metals fraction. This reviewer has observed that for the ICP concentrations reported at 10 to 15 times above the method detection limit (MDL), the data validation cannot reproduce the laboratory reported results. The calculation obtained during data validation is consistently higher than the laboratory reported concentration. This is due to the fact that the interelement correction factors in the ICP instrument have been externally calculated. Since this external interelement correction factor is not available for review, the reported results for low level samples cannot be reproduced. It should be noted that positive ICP reported results that are significantly above than the MDL were reproduced and validated, since this interelement correction factor becomes negligible at higher concentrations. The data review



assumes that the low level reported concentrations are correct as reported and it is this reviewer's opinion that data usability is not impacted.

### DATA QUALIFIERS

Overall, the data quality is good. The data validation review has identified aspects of the analytical data that require qualification. To confidently use any of the data within the data set, the data user should understand the limitations and qualifications presented. With regard to data usability, the following qualifiers are offered based upon the data provided.

#### ORGANIC QUALIFIERS

##### Hold Times:

- Sample SS-8 was initially analyzed within the hold time requirement for volatile organics. The sample was re-analyzed due to QC criteria out of control limits (surrogate recoveries and internal standard area performance). The re-analysis data was reported by the laboratory; however, the reanalysis was performed seven (7) days outside the hold time requirements. Due to the hold time exceedence, the non-detected volatile results for this sample are regarded as unreliable and have been flagged (R) on Table 2.

##### Blank Contamination:

- Due to the presence of methylene chloride in the trip-blank sample, TB-122191, the positive results of this compound in soil samples SS-12 and SS-19 are qualitatively questionable and have been flagged (B) on the summary tables.
- Due to the presence of methacrylonitrile in the heated purge and trap volatile (HP/T VOA) laboratory blank, associated with the groundwater sample FG-11GW, the positive result of this compound is qualitatively questionable and has been flagged (B) on the summary tables.

##### Surrogate Recoveries:

- The semivolatile surrogate, 2-fluorobiphenyl, was recovered outside the control limits (high) for all soil samples and may be biased high. No qualifier has been applied since only one surrogate per sample is outside the control limits.

#### Internal Standards Area Performance:

- The area count of the volatile internal standard, chlorobenzene-d5, was outside the control limits (low) for sample SS-18. The non-detected compounds quantitated against this internal standard are regarded as estimated values and have been flagged (UJ) on the summary tables.

#### Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Summary:

- The HP/T VOA blank spike recoveries of 1,4-dioxane and isobutyl alcohol, associated with the groundwater sample FG-11GW were outside the control limits (low). The positive and non-detected results of these compounds in the sample may be biased low and have been flagged (J/UJ) estimated on the summary tables.
- The HP/T VOA blank spike and matrix spike recovery of acrolein, associated with the groundwater sample FG-11GW, was less than 10%. The non-detected acrolein result in this sample is regarded as unreliable and have been flagged (R) on the summary tables.
- The semivolatile matrix spiking compound, 1,4-dichlorobenzene, were recovered outside the control limits (high) for sample SS-18MSD only and may be biased high. No qualifier has been applied since these compounds were recovered within control limits in the matrix spiked sample.

#### Initial and Continuing Calibration Results:

- Due to the high difference between the initial and continuing calibrations response factors (%D > 25% and < 90%) the non-detected results of the following compounds are regarded as estimated values and have been flagged (UJ) estimated on Table 2.

<u>Analyte</u>	<u>Fraction</u>	<u>Associated Samples</u>
Methylene chloride	VOA	SS-18
1,1,2,2-tetrachloroethane	VOA	FB122191
Isobutyl alcohol, acetone, acetonitrile & acrylonitrile	VOA	FG-11GW
4-Nitrophenol	BNA	SS-13, SS-19 and SS-9

- The response factors are less than 0.05 for the initial and continuing calibrations of the volatile compound, 2-chloroethylvinyl ether, associated with all soil samples and the P/T VOA compound, methyl ethyl ketone, associated with the groundwater sample FG-11GW. The non-detected results of these compounds are regarded as unreliable and have been flagged (R) on the summary tables.

Additional Comments:

- As per the requirements, all values calculated below the method detection limit should be considered estimated and have been flagged (J) on the data table.

INORGANIC PARAMETER QUALIFIERS

Hold Times:

- All samples were digested and analyzed within the required hold time criteria for priority pollutant metals.

Blank Contamination:

- Trace presence of selenium and silver were found in the metals laboratory blank at concentrations below the method detection limits (BMDL). The positive results of these analytes in the sample reported as BMDL are qualitatively questionable and have been flagged (B) on the summary table. The positive results above the method detection limits are regarded as "real values" and no qualifier has been applied.

Instrument Calibration and Verification:

- The initial and continuing calibration verification recoveries of all metals were reported within control limits.

ICP Serial Dilution Results:

- The ICP serial dilution analyses of cadmium, chromium, lead and zinc, associated with sample SS-11 were outside the control limits. The positive results of these analytes for the sample have been flagged (J) estimated on the summary table.

#### Matrix Spike (MS) and Duplicate (DU) Summary:

- Due to the low matrix spike recoveries of selenium and chromium in sample SS-11MS, the positive results of these analytes in the unspiked sample may be biased low have been flagged (J) estimated.
- Due to the high matrix spike recovery of mercury in sample SS-11MS, the positive result of this analyte in the unspiked sample may be biased high and has been flagged (J) estimated.
- Due to the high relative percent differences (RPD) associated with the duplicate analyses of lead, arsenic and selenium in sample SS-11D, the positive results of these analytes in the sample have been flagged (J) estimated.

#### Post-Digestion Spike Recoveries:

- The post-digestion spike recoveries of selenium for samples SS-12, SS-18, SS-9 and SS-13 were outside the control limits (low). The positive and non-detected selenium results for these samples may be biased low and have been flagged (J/UJ) estimated.

#### Additional Comments:

- The laboratory reports several inorganic results as below the method detection limit (BMDL). These are reported as BMDL on Table 2. The actual concentrations are not calculated during the data validation review since the interelement coefficient factors were not provided.

TABLE 2  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number		FG-11GW
Laboratory Sample Number		HA6541
Sampling Date	Quant	11/19/91
Dilution Factor	Limit	20
Units	ug/L	ug/L
APPENDIX IX HEATED P/T VOLATILE COMPOUNDS		
Acetonitrile	15	722
Acrolein	20	R
Acrylonitrile	10	U
1,4-Dioxane	300	756 J
Ethyl cyanide	40	U
Isobutyl alcohol	230	UJ
Methacrylonitrile	110	59 JB

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number		FG-11GW
Laboratory Sample Number		HA6541
Sampling Date	Quant	11/19/91
Dilution Factor	Limit	100
Units	ug/L	ug/L
APPENDIX IX P/T VOLATILE COMPOUNDS		
Acetone	10	950 J
Benzene	4.4	U
Bromoform	4.7	U
Carbon disulfide	10	U
Carbon Tetrachloride	2.8	U
Chlorobenzene	6.0	UJ
2-Chloro-1,3-butadiene	-	U
Chlorodibromomethane	3.1	U
Chloroethane	10	U
Chloroform	1.6	U
3-Chloropropene	10	UJ
Dichlorobromomethane	2.2	U
Dichlorodifluoromethane	10	U
1,2-Dibromo-3-chloropropane	10	U
1,2-Dibromoethane	10	U
1,4-Dichloro-2-butene	10	U
1,1-Dichloroethane	4.7	U
1,2-Dichloroethane	2.8	U
1,1-Dichloroethene	2.8	U
1,2-Dichloropropane	6.0	U
cis-1,3-Dichloropropene	5.0	U
trans-1,3-Dichloropropene	10	U
Ethylbenzene	7.2	U
Ethyl methacrylate	10	U
2-Hexanone	10	U
Iodomethane	10	U
Methyl bromide	10	U
Methyl chloride	10	U
Methylene Chloride	2.8	478 B
Methyl isobutyl ketone	10	5380
Methyl ethyl ketone	10	R
Methyl methacrylate	10	U
Pentachloroethane	-	U
Styrene	10	UJ
1,1,2,2-Tetrachloroethane	4.1	UJ
Tetrachloroethene	4.1	UJ

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number		FG-11GW
Laboratory Sample Number		HA6541
Sampling Date	Quant	11/19/91
Dilution Factor	Limit	100
Units	ug/L	ug/L
APPENDIX IX P/T VOLATILE COMPOUNDS (continued)		
Toluene	6.0	UJ
1,2-Dichloroethene (trans)	1.6	U
1,1,1-Trichloroethane	3.8	U
1,1,2-Trichloroethane	5.0	U
1,2,3-Trichloropropane	10	U
Trichloroethene	1.9	UJ
Trichlorofluoromethane	10	U
Vinyl acetate	10	U
Vinyl Chloride	10	U
m-Xylene	10	UJ
o,p-Xylenes	10	UJ

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number			SS-8	SS-9	SS-11	SS-12	SS-13	SS-18	SS-19	TB112101
Laboratory Sample Number			HA6824	HA6825	HA6816	HA6817	HA6818	HA6822	HA6823	HA6828
Sampling Date	Quant	Quant	11/21/91	11/21/91	11/21/91	11/21/91	11/21/91	11/21/91	11/21/91	11/21/91
Dilution Factor	Limit	Limit	1.6	1.4	1.2	1.2	5.0	1.2	1.2	1.0
Units	ug/L	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/L
PRIORITY POLLUTANT P/T VOLATILE COMPOUNDS										
Benzene	4.4	4.4	R	U	U	U	U	U	U	U
Bromoform	4.7	4.7	R	U	U	U	U	U	U	U
Carbon Tetrachloride	2.8	2.8	R	U	U	U	U	U	U	U
Chlorobenzene	6.0	6.0	R	U	U	U	U	U	U	U
Chlorodibromomethane	3.1	3.1	R	U	U	U	U	U	U	U
Chloroethane	10	10	R	U	U	U	U	U	U	U
2-Chloroethylvinyl ether	10	10	R	R	R	R	R	R	R	U
Chloroform	1.6	1.6	R	U	U	U	U	U	U	U
Dichlorobromomethane	2.2	2.2	R	U	U	U	U	U	U	U
Dichlorodifluoromethane	10	10	R	U	U	U	U	U	U	U
1,2-Dibromoethane	10	10	R	U	U	U	U	U	U	U
1,1-Dichloroethane	4.7	4.7	R	U	U	U	U	U	U	U
1,2-Dichloroethane	2.8	2.8	R	U	U	U	U	U	U	U
1,1-Dichloroethene	2.8	2.8	R	U	U	U	U	U	U	U
1,2-Dichloropropane	6.0	6.0	R	U	U	U	U	U	U	U
cis-1,3-Dichloropropene	5.0	5.0	R	U	U	U	U	U	U	U
trans-1,3-Dichloropropene	10	10	R	U	U	U	U	U	U	U
Ethylbenzene	7.2	7.2	R	U	U	U	U	U	U	U
Methyl bromide	10	10	R	U	U	U	U	U	U	U
Methyl chloride	10	10	R	U	U	U	U	U	U	U
Methylene Chloride	2.8	2.8	R	U	U	U	16.0 B	UJ	3.95 B	2.0 J
1,1,2,2-Tetrachloroethane	4.1	4.1	R	U	U	U	U	U	U	UJ
Tetrachloroethene	4.1	4.1	R	U	U	U	U	U	U	U
Toluene	6.0	6.0	R	U	U	U	U	UJ	U	U
1,2-Dichloroethene (trans)	1.6	1.6	R	U	U	U	U	UJ	U	U
1,1,1-Trichloroethane	3.8	3.8	R	U	U	U	U	UJ	U	U
1,1,2-Trichloroethane	5.0	5.0	R	U	U	U	U	UJ	U	U
Trichloroethene	1.9	1.9	R	U	U	U	U	U	U	U
Trichlorofluoromethane	10	10	R	U	U	U	U	U	U	U
Vinyl Chloride	10	10	R	U	U	U	U	U	U	U

continued next page (see last page of table for notes)



TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number			SS-8	SS-9	SS-11	SS-12	SS-13	SS-18	SS-19	TB112101
Laboratory Sample Number			HA6824	HA6825	HA6816	HA6817	HA6818	HA6822	HA6823	HA6828
Sampling Date	Quant	Quant	11/21/91	11/21/91	11/21/91	11/21/91	11/21/91	11/21/91	11/21/91	11/21/91
Dilution Factor	Limit	Limit	16	14	12	12	12	12	12	NA
Units	ug/L	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/L
ACID EXTRACTABLE COMPOUNDS										
2-Chlorophenol	3.9	340	U	U	U	U	U	U	U	NA
2,4-Dichlorophenol	3.2	280	U	U	U	U	U	U	U	NA
2,4-Dimethylphenol	3.2	280	U	U	U	U	U	U	U	NA
4,6-Dinitro-2-methylphenol	29	2400	U	U	U	U	U	U	U	NA
2,4-Dinitrophenol	50	4300	U	U	U	U	U	U	U	NA
2-Nitrophenol	4.3	370	U	U	U	U	U	U	U	NA
4-Nitrophenol	2.9	240	U	U	U	U	UJ	U	UJ	NA
4-Chloro-3-methylphenol	3.6	310	U	U	U	U	U	U	U	NA
Pentachlorophenol	4.3	370	U	U	U	U	U	U	U	NA
Phenol	1.8	150	U	U	U	U	U	U	U	NA
2,4,6-Trichlorophenol	3.2	280	U	U	U	U	U	U	U	NA

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number			SS-8	SS-9	SS-11	SS-12	SS-13	SS-18	SS-19	TB112191
Laboratory Sample Number			HA6824	HA6825	HA6816	HA6817	HA6818	HA6822	HA6823	HA6828
Sampling Date	Quant	Quant	11/21/91	11/21/91	11/21/91	11/21/91	11/21/91	11/21/91	11/21/91	11/21/91
Dilution Factor	Limit	Limit	16	14	12	12	12	12	12	NA
Units	ug/L	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/L
PRIORITY POLLUTANT BASE/NEUTRAL EXTRACTABLE COMPOUNDS										
Acenaphthene	2.3	220	U	U	U	U	U	U	U	NA
Acenaphthylene	4.2	410	U	U	U	U	U	U	U	NA
Anthracene	2.3	220	U	U	U	U	U	U	U	NA
Benzo(a)anthracene	9.3	910	4500 J	2068 J	2600 J	U	1490 J	U	3630 J	NA
Benzo(a)pyrene	3.0	290	U	U	U	U	U	U	2760 J	NA
Benzo(b)fluoranthene	5.7	560	7550 J	U	3250 J	U	U	U	3700 J	NA
Benzo(g,h,i)perylene	4.9	480	U	U	U	U	U	U	U	NA
Benzo(k)fluoranthene	3.0	290	U	U	U	U	U	U	2230 J	NA
bis(2-Chloroethoxy)methane	6.3	620	U	U	U	U	U	U	U	NA
Bis(2-chloroethyl) ether	6.8	660	U	U	U	U	U	U	U	NA
bis(2-chloroisopropyl)ether	6.8	660	U	U	U	U	U	U	U	NA
bis(2-Ethylhexyl)phthalate	12	1200	U	U	U	U	U	U	U	NA
4-Bromophenylphenyl ether	2.3	220	U	U	U	U	U	U	U	NA
Butylbenzylphthalate	12	1200	U	U	U	U	U	U	U	NA
2-Chloronaphthalene	2.3	220	U	U	U	U	U	U	U	NA
4-Chlorophenylphenyl ether	5.0	490	U	U	U	U	U	U	U	NA
Chrysene	3.0	290	5770	2534 J	3020	U	1770 J	U	4100	NA
Dibenz(a,h)anthracene	3.0	290	U	U	U	U	U	U	U	NA
1,2-Dichlorobenzene	2.3	220	U	U	U	U	U	U	U	NA
1,3-Dichlorobenzene	2.3	220	U	U	U	U	U	U	U	NA
1,4-Dichlorobenzene	5.2	510	U	U	U	U	U	U	U	NA
3,3'-Dichlorobenzidine	19.6	1920	U	U	U	U	U	U	U	NA
Diethylphthalate	12	1200	U	U	U	U	U	U	U	NA
Dimethylphthalate	12	1200	U	U	U	U	U	U	U	NA
Di-n-butylphthalate	12	1200	U	793 J	U	2238 J	1293 J	2588 J	1230 J	NA
2,4-Dinitrotoluene	6.8	660	U	U	U	U	U	U	U	NA
2,6-Dinitrotoluene	2.3	220	U	U	U	U	U	U	U	NA
Di-n-octylphthalate	12	1200	U	U	U	U	U	U	U	NA
Fluoranthene	2.6	260	9380	5320	4510	2190 J	3240	1282 J	7870	NA
Fluorene	2.3	220	U	U	U	U	U	U	U	NA
Hexachlorobenzene	2.3	220	U	U	U	U	U	U	U	NA
Hexachlorobutadiene	1.1	100	U	U	U	U	U	U	U	NA
Hexachlorocyclopentadiene	12	1200	U	U	U	U	U	U	U	NA
Hexachloroethane	1.9	190	U	U	U	U	U	U	U	NA
Indeno(1,2,3-cd)pyrene	4.4	430	U	U	U	U	U	U	U	NA
Isophorone	2.6	260	U	U	U	U	U	U	U	NA
Naphthalene	1.9	190	U	U	U	U	U	U	U	NA
Nitrobenzene	2.3	220	U	U	U	U	U	U	U	NA
N-Nitroso-dimethylamine	12	1200	U	U	U	U	U	U	U	NA
N-Nitroso-di-n-propylamine	12	1200	U	U	U	U	U	U	U	NA
N-Nitroso-diphenylamine	2.3	220	U	U	U	U	U	U	U	NA
Phenanthrene	6.4	630	7733 J	4082 J	2687 J	U	2573 J	1410 J	5012 J	NA
Pyrene	2.3	220	7750	4520	4080	1952 J	2980	1576 J	6570	NA
1,2,4-Trichlorobenzene	2.3	220	U	U	U	U	U	U	U	NA

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number Laboratory Sample Number Sampling Date Units	Quant Limit ug/L	Quant Limit ug/Kg	SS-8 HA6824 11/21/91 ug/Kg	SS-9 HA6825 11/21/91 ug/Kg	SS-11 HA6816 11/21/91 ug/Kg	SS-12 HA6817 11/21/91 ug/Kg	SS-13 HA6818 11/21/91 ug/Kg	SS-18 HA6822 11/21/91 ug/Kg	SS-19 HA6823 11/21/91 ug/Kg	TB112191 HA6828 11/21/91 ug/L
PRIORITY POLLUTANT INORGANIC PARAMETERS (METALS)										
Antimony	60	6000	BMDL J	BMDL J	U	U	U	9100	U	NA
Arsenic	100	1000	5100	15000	23000 J	5600	4200	22000	18000	NA
Beryllium	1.0	100	710	850	540	540	500	2000	860	NA
Cadmium	2.0	200	2500	3400	2700 J	2900	3200	12000	3300	NA
Chromium	10	1000	34000	44000	32000 J	17000	14000	803000	42000	NA
Copper	10	1000	34000	67000	48000	43000	46000	44000	54000	NA
Lead	5.0	500	120000	140000	240000 J	130000	160000	66000	290000	NA
Mercury	0.20	80	160	230	770 J	370	260	440	540	NA
Nickel	20	1000	19000	33000	24000	11000	18000	13000	26000	NA
Selenium	5.0	500	U	BMDL JB	BMDL JB	BMDL JB	BMDL JB	BMDL JB	U	NA
Silver	10	1000	BMDL JB	BMDL JB	BMDL JB	BMDL JB	BMDL JB	2300	BMDL JB	NA
Thallium	10	1000	U	U	U	U	U	U	BMDL J	NA
Zinc	20	2000	150000	514000	170000 J	230000	220000	130000	293000	NA

LEGEND:

- U Compound was not detected at laboratory method detection limit.
- J Estimated value due to limitations identified during the quality assurance review.
- UJ Reported method detection limit is estimated due to limitations identified during the quality assurance review.
- B Compound was detected in a laboratory and/or field blank at similar concentrations. May represent laboratory and/or field contamination.
- R Unreliable result. Compound may or may not be present.
- \* Sample analyzed at multiple dilutions. Summary table is a hybrid of diluted and undiluted results.
- No standard available. Compound was qualitatively searched for.
- IND Indeterminate. Standard and/or spikes could not be detected at method detection limit.
- BMDL Below Method Detection Limit reported by laboratory.

Discrepancies may exist between the laboratory data tables and the data validation summary tables due to variations in the rounding of calculations.



**DATA VALIDATION/QUALITY ASSURANCE REVIEW  
PHASE II RCRA FACILITY INVESTIGATION  
CHEM WASTE MANAGEMENT, INC. - CHICAGO INCINERATOR  
SAMPLE COLLECTION DATES: DECEMBER 2 THROUGH 10, 1991  
DAMES & MOORE JOB NO.: 13963-055-192**

**LABORATORY REPORT Nos.: 101462, 101467,  
101474, 101476 & 101481**

**INTRODUCTION**

Twenty (20) groundwater sample, plus one (1) field-duplicate sample, two (2) field-blank samples and five (5) trip-blank samples were collected and submitted to Environmental Testing Corporation (ETC) of Edison, New Jersey (1992 Illinois Certification No. 100224). All samples included in this review are listed on Table 1. The groundwater and field-blank samples were analyzed for RCRA Appendix IX heated purge and trap volatile organic compounds (HP/T VOA), purge and trap volatile organic compounds (P/T VOA), semivolatile organic compounds (base/neutral and acid-extractable organic compounds) and metals. The trip-blank samples were analyzed for RCRA Appendix IX HPT and P/T volatile organic compounds only. All samples were analyzed following USEPA SW-846 Methodologies.

A data validation review was performed on all samples prepared under a modified CLP-SOW 3/90 CLP-I data deliverable format. Data were examined to assess the usability of the results, as well as to assess compliance relative to data package deliverable requirements. The organic data review is based upon a rigorous review of the reported hold times, surrogate recoveries, blank spike recoveries, matrix spike and matrix spike duplicate summaries, blank contaminants, internal standard area performance, Gas Chromatography/Mass Spectroscopy (GC/MS) tuning and calibration data.

The inorganic data review is based on a review of the reported hold times, blank analysis results, blank spike recoveries, matrix spike and duplicate results, calibration results, post-digestion spike recoveries and Inductively Coupled Plasma (ICP) serial dilution analysis.

Details of the data validation/quality assurance review are presented in the narrative section of the report. The data is summarized in Table 2 of the report. Data qualifiers have been placed next to the results so that the data user can quickly assess the qualitative and/or quantitative reliability of the reported result. This report was prepared to provide a critical review of the laboratory analysis and reported chemical results. Quality assurance reviews of laboratory-generated data routinely identify problems associated with analytical measurements, even from the most experienced and capable laboratories.

This review has been performed in accordance with the requirements specified in the "Laboratory Data Validation Functional Guidelines for Evaluating Organic Analyses" dated February 1988 and "Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses" dated July 1988.

**TABLE 1**  
**SAMPLES INCLUDED IN REVIEW**

<u>Sample ID</u>	<u>Lab ID</u>	<u>Date Collected</u>	<u>Test Requested</u>
<u>Log Link No. 101462</u>			
FG-14	HA6544	12/02/91	RCRA Appendix IX HP/T VOA, P/T VOA, BNA & Metals
TB-120391	HA6591	12/02/91	RCRA Appendix IX HP/T VOA & P/T VOA
<u>Log Link No. 101467</u>			
FG-13GW	HA6545	12/02/91	RCRA Appendix IX HP/T VOA, P/T VOA, BNA & Metals
G314	HA6547	12/05/91	RCRA Appendix IX HP/T VOA, P/T VOA, BNA & Metals
G307	HA6548	12/05/91	RCRA Appendix IX HP/T VOA, P/T VOA, BNA & Metals
GWDUP02	HA6549	12/05/91	RCRA Appendix IX HP/T VOA, P/T VOA, BNA & Metals
G342	HA6550	12/05/91	RCRA Appendix IX HP/T VOA, P/T VOA, BNA & Metals
G344	HA6551	12/05/91	RCRA Appendix IX HP/T VOA, P/T VOA, BNA & Metals
G332	HA6554	12/05/91	RCRA Appendix IX HP/T VOA, P/T VOA, BNA & Metals
TB-120591	HA6592	12/05/91	RCRA Appendix IX HP/T VOA & P/T VOA
<u>Log Link No. 101474</u>			
GWFB120691	HA6584	12/06/91	RCRA Appendix IX HP/T VOA, P/T VOA, BNA & Metals
GWTB120691	HA6593	12/06/91	RCRA Appendix IX HP/T VOA & P/T VOA
<u>Log Link No. 101476</u>			
G343	HA6552	12/09/91	RCRA Appendix IX HP/T VOA, P/T VOA, BNA & Metals
G347	HA6553	12/09/91	RCRA Appendix IX HP/T VOA, P/T VOA, BNA & Metals
G305	HA6556	12/09/91	RCRA Appendix IX HP/T VOA, P/T VOA, BNA & Metals

<u>Sample ID</u>	<u>Lab ID</u>	<u>Date Collected</u>	<u>Test Requested</u>
<u>Log Link No. 101476 (continued)</u>			
G348	HA6562	12/09/91	RCRA Appendix IX HP/T VOA, P/T VOA, BNA & Metals
FG-15GW	HA6563	12/09/91	RCRA Appendix IX HP/T VOA, P/T VOA, BNA & Metals
G330	HA6564	12/09/91	RCRA Appendix IX HP/T VOA, P/T VOA, BNA & Metals
G303	HA6569	12/09/91	RCRA Appendix IX HP/T VOA, P/T VOA, BNA & Metals
G349	HA6570	12/09/91	RCRA Appendix IX HP/T VOA, P/T VOA, BNA & Metals
GWFB120991	HA6585	12/09/91	RCRA Appendix IX HP/T VOA, P/T VOA, BNA & Metals
TB120991	HA6594	12/09/91	RCRA Appendix IX HP/T VOA & P/T VOA

Log Link No. 101481

G308	HA6558	12/10/91	RCRA Appendix IX HP/T VOA, P/T VOA, BNA & Metals
G337	HA6561	12/10/91	RCRA Appendix IX HP/T VOA, P/T VOA, BNA & Metals
G324	HA6566	12/10/91	RCRA Appendix IX HP/T VOA, P/T VOA, BNA & Metals
G302	HA6567	12/10/91	RCRA Appendix IX HP/T VOA, P/T VOA, BNA & Metals
G318	HA6568	12/10/91	RCRA Appendix IX HP/T VOA, P/T VOA, BNA & Metals
TB121091	HA6595	12/10/91	RCRA Appendix IX HP/T VOA & P/T VOA

Legend:

HP/T VOA	=	RCRA Appendix IX Heated Purge and Trap Volatile Organic Compounds
P/T VOA	=	RCRA Appendix IX Purge and Trap Volatile Organic Compounds
BNA	=	RCRA Appendix IX Semivolatile Organic Compounds (Base/Neutral and Acid-Extractable Organic Compounds)

GENERAL COMMENTS

With regard to the data package deliverables, most of the requirements were met with the exception of the following anomalies noted during the data validation review. Please note that these deficiencies do not impact the data usability:

- This reviewer has observed that for the ICP concentrations reported at 10 to 15 times above the method detection limit (MDL), the data validation cannot reproduce the laboratory reported results. The calculation obtained during data validation is consistently higher than the

laboratory reported concentration. This is due to the fact that the interelement correction factors in the ICP instrument have been externally calculated in the system. Since this external interelement correction factor is not available for review, the reported results for low level samples cannot be reproduced. It should be noted that positive ICP reported results that are significantly above than the MDL (approximately 100 times higher or more) were reproduced and validated, since this interelement correction factor becomes negligible at higher concentrations. The data review assumes that the low level reported concentrations (10 to 15 times the MDL) are correct as reported and it is this reviewer's opinion that data usability is not impacted.

- In the heated purge and trap volatile (HP/T VOA) analysis, the concentration of acetonitrile of sample G344 was reported as 51.2 ug/L. The data validation review has calculated an acetonitrile concentration of 63.96 ug/L for this sample.
- Sample FG-13GW was reanalyzed for semivolatile organics at 1:20 and 1:200 dilutions due to target compound concentrations exceeding the linear calibration range requirements. The tune and calibration data were provided for the initial and 1:20 dilution analyses; however, the tune and calibration data associated with the 1:200 dilution analyses were not provided for review. Therefore, no comments can be offered regarding the compound compliance criteria associated with results quantitated from this 1:200 dilution analysis.

### DATA QUALIFIERS

The data validation review has identified aspects of the analytical data that require qualification. To confidently use any of the data within the data set, the data user should understand the limitations and qualifications presented. With regard to data usability, the following qualifiers are offered based upon the data provided.

### ORGANIC QUALIFIERS

#### Hold Times:

- All samples were analyzed and/or extracted within the required hold time criteria for all organic parameters.



#### Blank Contamination:

- No blank contaminants have been identified in the volatile and semivolatile laboratory blanks, as well as the field and trip-blank samples, for the samples reviewed.

#### Surrogate Recoveries:

- The volatile surrogates, toluene-d8 and bromofluorobenzene (BFB), were recovered outside the control limits (high) for sample G332(1:20DL). The positive results quantitated from this dilution analysis may be biased high and have been flagged (J) estimated.
- The volatile surrogate, toluene-d8, was recovered outside the control limits (low) for sample FG-14(1:100DL). The positive and non-detected results quantitated from this initial dilution analysis may be biased low and have been flagged (J/UJ) estimated on the summary tables.
- All semivolatile surrogates for sample G305 were recovered less than 10%. This samples was reanalyzed with all surrogates recovered less than 10% which indicates a possible matrix effect. The initial analysis was reported by the laboratory. The non-detected semivolatile results for this sample are regarded as unreliable (compound may or may not be present) and have been flagged (R) on the summary tables.
- The semivolatile surrogates, phenol for sample FG-14, nitrobenzene-d5 for samples FG-13GW and G308; 2,4,6-tribromophenol for samples G343 and G347; and 2-fluorobiphenyl for sample GWDUP02, were outside the control limits (high) and may be biased high. No qualifier has been applied since only one surrogate per sample is outside the control limits.
- The semivolatile surrogate, 2-fluorobiphenyl, was recovered outside the control limits (low) for sample G344 and may be biased low. No qualifier has been applied since only one surrogate per sample is outside the control limits.

#### Internal Standard Area Counts:

- The area counts of the semivolatile internal standards, naphthalene-d8 for samples FG-14 and FG-13GW, and phenanthrene-d10, chrysene-d12 and perylene-d12 for samples G348 and G324, were outside the control limits (low). The positive and non-detected compounds quantitated against these internal standards are regarded as estimated values and have been flagged (J/UJ) on the summary tables.

- The area counts of the semivolatile internal standards, chrysene-d12 and perylene-d12 were outside the control limits (high) for samples G337 and G302. The positive and non-detected compounds quantitated against these internal standards are regarded as estimated values and have been flagged (J/UJ) on the summary tables.

#### Matrix Spike and Matrix Spike Duplicate Summary (MS/MSD):

- The blank spike recoveries of all HP/T VOA compounds, associated with the analysis of samples G343, G347, G305, G348, FG-15GW, G330, G303 and G349, were outside the control limits (high). The positive HP/T VOA results may be biased high and have been flagged (J) estimated on the summary tables. There is no impact on the non-detected results and no qualifier has been applied.
- The semivolatile blank spike recoveries of butylbenzylphthalate, p-chloroaniline, di-n-butyl phthalate, 3,3'-dichlorobenzidine, 4-nitrophenol, phenol and isophorone, associated with samples FG-14, FG-13GW, G314, G307, GWDUP02, G342, G344, G332 and GWFB120691, were recovered outside the control limits (low). The positive and non-detected results of these compounds in the aforementioned samples are regarded as estimated values and have been flagged (J/UJ) on the summary table.
- The semivolatile blank spike recoveries of aniline, butylbenzylphthalate, di-n-butyl phthalate, 3,3'-dichlorobenzidine, 4-nitrophenol and phenol, associated with samples G343, G347, G305, G348, FG-15GW, G330, G303, G349, GWFB120991, G308, G337, G324, G302 and G318 were recovered outside the control limits (low). The positive and non-detected results of these compounds in these samples are regarded as estimated values and have been flagged (J/UJ) on Table 2.
- The semivolatile blank spiking compounds, diethyl phthalate and dimethyl phthalate, associated with all samples were recovered less than 10%. The non-detected results in all samples are regarded as unreliable and have been flagged (R) on Table 2.
- The reproducibility of the volatile matrix spiking compound, iodomethane for sample G343 is poor. The non-detected result of this compound in the sample is regarded as an estimated value and has been flagged (UJ) on the summary tables.
- The acid-extractable matrix spiking compounds, phenol and 4-nitrophenol, were not recovered (0%) for samples G342MS/MSD. Since the concentration of phenol in the unspiked sample is greater than 4 times

the spike-added concentration, no qualifier has been applied. For 4-nitrophenol, however, the non-detected result of this compound in the unspiked sample is regarded as unreliable and has been flagged (R) on Table 2.

- The semivolatile matrix spiking compound, 2-chlorophenol and 1,2,4-trichlorobenzene, were recovered outside the control limits (high) for samples G342MS/MSD and may be biased high. No qualifier has been applied to 2-chlorophenol since the concentration of this compound in the unspiked sample is greater than 4 times the spike-added concentration. Likewise, no qualifier has been applied to 1,2,4-trichlorobenzene since this compound was non-detected in the unspiked sample.
- The semivolatile matrix spiking compounds, 1,2,4-trichlorophenol and 4-chloro-3-methylphenol, were recovered outside the control limits (high) for samples G349MS/MSD and may be biased high. No qualifier has been applied since these compounds were non-detected in the unspiked sample.
- Sample GWDUP02 was collected and submitted to the laboratory as a blind field-duplicate of sample G342. The reproducibility of the organic results are good, providing a positive indication of the field techniques and laboratory precision associated with the samples.

#### Initial and Continuing Calibrations:

- Sample G332 was reanalyzed at a 1:20 dilution for HP/T VOA due to target compound concentrations exceeding the linear calibration range requirements. The HP/T VOA results for this sample is a hybrid of both the initial (1:5 dilution) and 1:20 dilution reanalyses.
- Sample FG-14 was analyzed at 1:200 dilution for HP/T VOA and no water soluble target compounds have been identified. Although the total ion chromatogram of this sample contained high peaks of non-HP/T VOA compounds, good laboratory practice calls for reanalysis of this samples at a lower dilution when target compounds have not been detected.
- Samples FG-14, GWDUP02 and G332 were reanalyzed at higher dilutions for P/T VOA due to target compound concentrations exceeding the linear calibration range requirements. The reported results from these samples are a hybrid of both initial and dilution analyses.

- Samples FG-14, FG-13GW, GWDUP02, G342, G344, G332, G348, G349 and G308 were reanalyzed for semivolatiles at higher dilutions due to target compound concentrations exceeding the linear calibration range requirements. The semivolatile results for these samples are a hybrid of the initial and dilution analyses.
- Due to the high difference between the initial and continuing calibrations response factors (%D > 25% and < 90%), all positive results for the following volatile compounds have been flagged (J) estimated. The actual detection limit may be higher than reported and have been flagged (UJ) estimated on the summary tables.

<u>Compound</u>	<u>Log Link</u>	<u>Associated Sample</u>
All HP/T VOA Cmpds.	101481	All Field Samples
Acetonitrile & Acrylonitrile	101462	TB-120391
	101467	FG-13GW, G314, G307, GWDUP02, G342, G344, G332 & TB-120591
	101474	TB-120691
	101476	G343, G347, G305, G348, FG-15GW, G330, G303 & G349
	101481	TB-1209991, TB-121091 & GWFB-120991
Methacrylonitrile	101462	TB-120391
	101467	FG-13GW, G314, G307, GWDUP02, G342, G344, G332 & TB-120591
	101474	TB120691
Acetone	101467	FG-13GW, G314, G342, G344, G332, TB1205-91 & FB120691
	101476	G343, G347, G348, G305, FG-15GW, G330, G303 & G349
	101481	All Samples
Iodomethane	101476	G349
	101481	G324, G302 & G318

- The percent differences between the initial and continuing calibration response factors of the HP/T VOA compounds, acrolein and acrylonitrile, associated with samples G308, G337, G324, G302 and G318, were greater than 90%. The non-detected results of these compounds are regarded as unreliable and have been flagged (R) on Table 2.
- Due to the high difference between the initial and continuing calibration response factors (%D > 25% and < 90%), all positive results for the following semivolatile compounds have been flagged (J) estimated. The

actual detection limit may be higher than reported and have been flagged (UJ) estimated on the summary tables.

<u>Compound</u>	<u>Log Link</u>	<u>Associated Sample</u>
N-Nitrosodi-n-propyl-amine	101467	G307 & G342
	101474	GWFB120691
	101476	G349, G343, G347, G348, FG-15GW, G330 & G303
	101481	GWFB120991, G308, G324 & G318
2,4-Dinitrophenol	101467	G307
	101474	GWFB120691
	101476	G343, G347, G348, FG-15GW, G330 & G303
	101481	GWFB120991, G308, G324 & G318
m-Nitroaniline , 3-Nitro-aniline, 2,4-Dinitrotoluene, 2,3,4,6-tetrachlorophenol & 4,6-Dinitro-o-cresol	101467	G342
Pyridine, Hexachloro-cyclopentadiene, 3,3'-Dichlorobenzidine & 7,12-Dimethylbenzo(a)anthracene	101476	G349
Hexachlorobenzene	101476	G343, G347, G348, FG-15GW, G330 & G303
	101481	GWFB120991, G308, G324, G318, G337 & G302

- The response factors of the volatile compounds, acrolein and methyl ethyl ketone (MEK) in both the initial and continuing calibrations associated with all samples are less than 0.05. Positive results of these compounds may be biased low and have been flagged (J) estimated. The non-detected results are regarded as unreliable and have been flagged (R) on table 2.
- The response factors of the following semivolatile compounds, in the initial and continuing calibrations associated with the samples are less than 0.05. Positive results of these compounds may be biased low and have been flagged (J) estimated. The non-detected results are regarded as unreliable and have been flagged (R) on the summary table.

<u>Compound</u>	<u>Log Link</u>	<u>Associated Sample</u>
Dimethylbenzidine	101476	G343, G347, G348, FG-15GW, G330, G303 & G349
	101481	GWFB120991, G308, G324, G318, G337 & G302
Hexachlorophene	All Log Links	All Samples

Additional Comments:

- As per the requirements, all values calculated below the method detection limit should be considered estimated and have been flagged (J) on the data table.

INORGANIC PARAMETER QUALIFIERS

Hold Times:

- All samples were digested and analyzed within the required hold time criteria for the metals analyses.

Blank Contamination:

- Trace presence of metal analytes were identified in the laboratory blanks, as well the field-blank samples, at below the method detection limits (BMDL). The positive results of these analytes reported as BMDL are qualitatively questionable and have been flagged (B) on the summary tables. The positive results reported above the method detection limits (MDL) are regarded as "real" and no qualifier has been applied. The following samples have been flagged (B) on the summary tables.

<u>Analyte</u>	<u>Log Link No.</u>	<u>Associated Sample</u>
Antimony	101467	G314
	.01481	G337
Copper	101476	FG-15GW
Lead	101462	FG-14
	101467	FG-13GW, G314, G307, GWDUP02, G342 & G344
	101476	G343, G348, FG-15GW, G330, G303 & G349
	101481	G308 & G337

<u>Analyte</u>	<u>Log Link No.</u>	<u>Associated Sample</u>
Zinc	101462	FG-14
	101467	FG-13GW & G344
	101476	G332
	101481	G308

#### Instrument Calibration and Verification:

- The initial and continuing calibration verification recoveries of all metals were reported within control limits.

#### ICP Serial Dilution Results:

- The percent differences (%D) in the ICP serial dilution analyses of sample G343 were within control limits.

#### Matrix Spike (MS) and Duplicate (DU) Summary:

- All metals blank spike recoveries were reported within control limits.
- Due to the low matrix spike recoveries of cadmium in samples FG-14MS and G343, and mercury in sample G343 only, the positive and non-detected results of these analytes in the unspiked samples may be biased low and have been flagged (J/UJ) estimated.
- The matrix spike recovery of mercury in sample FG-14 was recovered outside the control limits (high) and may be biased high. No qualifier has been applied since mercury was non-detected in the unspiked sample.
- Sample GWDUP02 was collected and submitted to the laboratory as a blind field-duplicate of sample G342. The reproducibility of the metals results are good, providing a positive indication of the field techniques and laboratory precision associated with these samples.

#### Post-Digestion Spike Recoveries:

- The post-digestion spike recoveries of the following analytes were outside the control limits (low). The positive and non-detected results of these analytes for the associated samples may be biased low and have been flagged (J/UJ) estimated.

<u>Analyte</u>	<u>Log Link</u>	<u>Associated Sample</u>
Arsenic	101467	FG-13GW, G307 & G332
<u>Analyte</u>	<u>Log Link</u>	<u>Associated Sample</u>

Arsenic	101476	G347, G305, G348, FG-15GW, G330, G303 & G349
	101481	G318, G324, G308, G337 & G302
Lead	101467	G342
Selenium	101462	FG-14,
	101467	G314, G342 & G344
	101476	G347, G305, G348, G303 & G349
	101481	G337, G324 & G318
Thallium	101476	G343, G347, G305, G348 & G349
	101481	GWFB120991, G308 & G337

- The post-digestion spike recovery of lead for samples G343, G305, G348, FG-15GW, G330, G349, G343, G324, G302 and G318 fell outside the control limits (high) and may be biased high. The positive lead results in these samples may be biased high and have been flagged (J) estimated. There is no impact on the non-detected lead results and no qualifier has been applied.

#### Additional Comments:

- The laboratory reports several inorganic results as below the method detection limit (BMDL). These are reported as BMDL on Table 2. The actual concentrations are not calculated during the data validation review since the interelement coefficient factors were not provided.



**TABLE 2**  
**SUMMARY OF ANALYTICAL RESULTS**  
**PHASE II INVESTIGATION**  
**CHEMICAL WASTE MANAGEMENT**  
**CHICAGO, ILLINOIS**

Dames and Moore Sample Number		FG-13GW	FG-14	FG-15GW	G302	G303	G305	G307	G308	G314
Laboratory Sample Number		HA6545	HA6544	HA6563	HA6567	HA6569	HA6556	HA6548	HA6558	HA6547
Sampling Date	Quant	12/02/91	12/02/91	12/09/91	12/10/91	12/09/91	12/09/91	12/05/91	12/10/91	12/05/91
Dilution Factor	Limit	10	200	200	1.0	1.0	1.0	1.0	1.0	1.0
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
<b>APPENDIX IX HEATED P/T VOLATILE COMPOUNDS</b>										
Acetonitrile	15	UJ	UJ	140 J	R	UJ	UJ	UJ	R	917 J
Acrolein	20	R	UJ	R	R	R	R	R	R	R
Acrylonitrile	10	UJ	UJ	UJ	R	UJ	UJ	UJ	R	UJ
1,4-Dioxane	300	U	UJ	U	UJ	U	U	U	UJ	U
Ethyl cyanide	40	U	UJ	U	UJ	U	U	U	UJ	U
Isobutyl alcohol	230	U	UJ	U	UJ	U	U	U	UJ	U
Methacrylonitrile	110	UJ	UJ	U	UJ	U	U	UJ	UJ	UJ

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TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number		FG-13GW	FG-14	FG-15GW	G302	G303	G305	G307	G308	G314
Laboratory Sample Number		HA6545	HA6544	HA6563	HA6567	HA6569	HA6556	HA6548	HA6558	HA6547
Sampling Date	Quant	12/02/91	12/02/91	12/09/91	12/10/91	12/09/91	12/09/91	12/05/91	12/10/91	12/05/91
Dilution Factor	Limit	20	200	50	1.0	1.0	1.0	1.0	1.0	25
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
APPENDIX IX P/T VOLATILE COMPOUNDS										
Benzene	4.4	115	142000	U	40.9	U	U	U	34.2	1050
Methyl bromide	10	U	UJ	482	U	U	U	U	U	U
Carbon disulfide	10	U	UJ	U	U	U	U	U	15.1	U
Chloroethane	10	U	UJ	U	U	U	U	U	U	U
Chlorobenzene	6.0	57.2 J	701 J	U	U	U	U	U	U	U
2-Chloro-1,3-butadiene	-	U	UJ	U	15.2	U	U	U	U	U
Chloroform	1.6	U	4480 J	U	U	U	U	U	U	U
Methyl chloride	10	U	UJ	U	U	U	U	U	U	U
3-Chloropropene	10	U	UJ	U	U	U	U	U	U	U
1,2-Dibromo-3-chloropropane	10	U	UJ	U	U	U	U	U	U	U
1,2-Dibromoethane	10	U	UJ	U	U	U	U	U	U	U
Dibromoethane	10	U	UJ	U	U	U	U	U	U	U
1,4-Dichloro-2-butene	10	U	UJ	U	U	U	U	U	U	U
Dichlorodifluoromethane	10	U	UJ	U	U	U	U	U	U	U
1,1-Dichloroethane	4.7	U	3560 J	U	U	U	U	U	7.71	U
1,2-Dichloroethane	2.8	U	6250 J	U	U	U	U	U	9.79	U
1,2-Dichloroethane (trans)	1.6	U	251 J	U	U	U	U	U	U	U
1,1-Dichloroethene	2.8	97.8 J	39800	2430	U	U	U	U	2.7 J	3500
Methylene Chloride	2.8	U	8360 J	764	U	U	15.0	U	9.56	U
1,2-Dichloropropane	6.0	U	UJ	U	U	U	U	U	U	U
cis-1,3-Dichloropropene	5.0	U	UJ	U	U	U	U	U	U	U
trans-1,3-Dichloropropene	10	U	UJ	U	U	U	U	U	U	U
Chlorodibromomethane	3.1	U	UJ	U	U	U	U	U	U	U
Dichlorobromomethane	2.2	U	UJ	U	U	U	U	U	U	U
Ethyl methacrylate	10	U	UJ	U	U	U	U	U	U	U
Iodomethane	10	U	UJ	U	UJ	U	U	U	U	U
Methyl ethyl ketone	10	R	R	R	R	R	R	R	R	R
Methyl methacrylate	10	U	UJ	U	U	U	U	U	U	U
Pentachloroethane	-	U	UJ	U	U	U	U	U	U	U
1,1,1,2-Tetrachloroethane	6.9	U	UJ	U	U	U	U	U	U	U
1,1,2,2-Tetrachloroethane	4.1	U	UJ	U	U	U	U	U	U	U
Tetrachloroethene	4.1	U	2650 J	U	U	U	U	U	U	U
Carbon Tetrachloride	2.8	U	UJ	U	U	U	U	U	U	U
Toluene	6.0	1470	85200	2820	U	U	U	1.3 J	27.9	48.7 J
Bromoform	4.7	U	UJ	U	U	U	U	U	U	U
1,1,1-Trichloroethane	3.8	22.9 J	67400	U	U	U	U	U	U	U
1,1,2-Trichloroethane	5.0	U	28800	U	U	U	6.18	U	U	U
Trichloroethene	1.9	U	2220	U	U	U	U	U	U	U
Trichlorofluoromethane	10	U	UJ	U	U	U	U	U	U	U

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TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number		FG-13GW	FG-14	FG-15GW	G302	G303	G305	G307	G308	G314
Laboratory Sample Number		HA6545	HA6544	HA6563	HA6567	HA6569	HA6556	HA6548	HA6558	HA6547
Sampling Date	Quant	12/02/91	12/02/91	12/08/91	12/10/91	12/09/91	12/09/91	12/05/91	12/10/91	12/05/91
Dilution Factor	Limit	20	200	50	1.0	1.0	1.0	1.0	1.0	25
Units	(Aq/Soil)	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
APPENDIX IX P/T VOLATILE COMPOUNDS										
1,2,3-Trichloropropane	10	U	UJ	U	U	U	U	U	U	U
Vinyl Chloride	10	U	UJ	U	U	U	U	U	U	2250
Acetone	10	UJ	UJ	UJ	UJ	UJ	UJ	U	UJ	UJ
Ethylbenzene	7.2	158	13400 J	U	U	U	U	U	U	U
2-Hexanone	10	U	UJ	U	U	U	U	U	U	U
Methyl isobutyl ketone	10	3640	18600 J	U	U	U	U	U	U	U
Styrene	10	U	4180 J	U	U	U	U	U	U	U
Vinyl acetate	10	U	UJ	U	U	U	U	U	U	U
m-Xylene	10	338	6480	U	U	U	U	U	U	U
o,p-Xylenes	10	234	5060	U	U	U	U	U	U	U

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TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number		FG-13GW	FG-14	FG-15GW	G302	G303	G305	G307	G308	G314
Laboratory Sample Number		HA0545	HA0544	HA0563	HA0567	HA0569	HA0556	HA0548	HA0558	HA0547
Sampling Date	Quant	12/02/91	12/02/91	12/09/91	12/10/91	12/09/91	12/09/91	12/05/91	12/10/91	12/05/91
Dilution Factor	Limit	20	200	50	1.0	1.0	1.0	1.0	1.0	25
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
APPENDIX IX SEMIVOLATILE COMPOUNDS										
Acetophenone	10	UJ	UJ	11.8	U	U	R	U	U	U
2-Acetylaminofluorene	10	U	U	U	U	U	R	U	U	U
4-Aminobiopheny	10	U	U	U	U	U	R	U	U	U
Aniline	10	2650	5190	U	UJ	UJ	R	U	46.7	U
Aramite	10	U	U	U	U	U	R	U	U	U
Benzo(A)anthracene	8.0	U	U	U	UJ	U	R	U	U	U
Benzo(b)fluoranthene	4.9	U	U	U	UJ	U	R	U	U	U
Benzo(a)pyrene	2.6	U	U	U	UJ	U	R	U	U	U
Bis(2-Chloroethoxy)methane	5.5	UJ	UJ	U	U	U	R	U	U	U
Bis(2-chloroethyl) ether	5.9	U	U	U	U	U	R	U	U	U
Bis(2-chloroisopropyl)ether	5.9	U	U	U	U	U	R	U	U	U
Bis(2-Ethylhexyl)phthalate	10	U	U	U	UJ	U	R	U	U	U
4-Bromophenylphenyl ether	2.0	U	U	U	U	U	R	U	U	U
Butylbenzylphthalate	10	UJ	UJ	UJ	UJ	UJ	R	UJ	U	UJ
2-sec-Butyl-4,6-dinitrophen	10	U	U	U	U	U	R	U	U	U
p-Chloraniline	10	13500 J	42900 J	U	U	U	R	UJ	617	UJ
p-Chloro-m-cresol	3.1	U	U	U	U	U	R	U	U	U
2-Chloranaphthalene	2.0	U	U	U	U	U	R	U	U	U
2-Chlorophenol	3.4	1210	11100	8.21	U	U	R	U	73.8	18.4
Chrysene	2.6	U	U	U	UJ	U	R	U	U	U
Acenaphthene	2.0	U	U	U	U	U	R	U	14.4	U
Acenaphthylene	3.6	U	U	U	U	U	R	U	U	U
Anthracene	2.0	U	U	U	U	U	R	U	U	U
Benzo(ghi)perylene	3.2	U	U	U	UJ	U	R	U	U	U
Benzo(k)fluoranthene	2.6	U	U	U	UJ	U	R	U	U	U
Fluorene	2.0	U	U	U	U	U	R	U	9.78	U
Phenanthrene	5.6	U	42.6 J	U	U	U	R	U	22.9	U
Pyrene	2.0	U	U	U	UJ	U	R	U	4	U
2-Nitrophenol	3.7	UJ	UJ	U	U	U	R	U	U	U
o-Cresol	10	14.1 J	721	U	U	U	R	U	18.1	6.5 J
m+p-Cresols	10	7.2 J	35500	13.5	U	U	R	U	452	232
Diallate	10	U	U	U	U	U	R	U	U	U
Dibenzo(a,h)anthracene	2.6	U	U	U	UJ	U	R	U	U	U
Di-n-butyl phthalate	10	UJ	UJ	UJ	UJ	UJ	R	UJ	U	UJ
1,2-Dichlorobenzene	2.0	6.16	4970	6.64	U	U	R	U	U	U
1,3-Dichlorobenzene	2.0	U	432	U	U	U	R	U	U	U
1,4-Dichlorobenzene	4.5	U	559	U	U	U	R	U	U	U
3,3-Dichlorobenzidine	17	UJ	UJ	UJ	U	UJ	R	UJ	U	UJ
2,4-Dichlorophenol	2.8	31400 J	62600	4.58	UJ	U	R	U	1280	U
2,6-Dichlorophenol	10	UJ	6560 J	U	U	U	R	U	U	U

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number		FG-13GW	FG-14	FG-15GW	G302	G303	G305	G307	G308	G314
Laboratory Sample Number		HA6545	HA6544	HA6563	HA6567	HA6569	HA6556	HA6548	HA6558	HA6547
Sampling Date	Quant	12/02/91	12/02/91	12/09/91	12/10/91	12/09/91	12/09/91	12/05/91	12/10/91	12/05/91
Dilution Factor	Limit	20	200	50	1.0	1.0	1.0	1.0	1.0	25
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
APPENDIX IX SEMIVOLATILE COMPOUNDS (continued)										
Diethylphthalate	2.6	R	R	R	R	R	R	U	R	R
p-Dimethylaminoazobenzene	5.5	U	U	U	UJ	U	R	U	U	U
7,12-Dimethylbenzo(a)anthra	5.9	U	U	U	UJ	U	R	U	U	U
3,3-Dimethylbenzidine	5.9	U	U	R	U	R	R	U	R	U
a-a-Dimethylphenethylamine	10	-	-	U	U	U	R	U	-	-
2,4-Dimethylphenol	2.0	UJ	7250 J	-	U	U	R	U	77.9	U
Dimethyl phthalate	10	R	R	R	R	UJ	R	U	R	R
m-Dinitrobenzene	10	U	U	U	U	U	R	U	U	U
4,6-Dinitro-0-cresol	10	U	U	U	U	U	R	U	U	U
2,4-Dinitrophenol	3.1	U	U	UJ	U	UJ	R	UJ	UJ	U
2,4-Dinitrotoluene	2.0	U	U	U	U	U	R	U	U	U
2,6-Dinitrotoluene	3.4	U	U	U	U	U	R	U	U	U
Di-n-octyl phthalate	2.6	U	U	U	UJ	U	R	U	U	U
Diphenylamine	2.0	U	U	U	U	U	R	U	U	U
N-nitrosodipropylamine	3.6	U	U	UJ	U	UJ	R	UJ	UJ	U
Ethyl methanesulfonate	2.0	U	U	U	U	U	R	U	U	U
Fluoranthene	3.2	U	U	U	U	U	R	U	6.23	U
Hexachlorobenzene	2.8	U	U	10.3 J	UJ	UJ	R	U	UJ	U
Hexachlorobutadiene	2.0	UJ	UJ	U	U	U	R	U	U	U
Hexachlorocyclopentadiene	5.6	U	U	U	U	U	R	U	U	U
Hexachloroethane	2.0	U	U	U	U	U	R	U	U	U
Isodrin	3.7	U	U	U	U	U	R	U	U	U
Hexachlorophene	10	U	U	R	R	R	R	R	U	U
Hexachloropropene	10	R	R	U	U	U	R	U	R	R
Indeno(1,2,3-c,d)pyrene	10	U	U	U	UJ	U	R	U	U	U
Isosafrole	2.6	U	U	U	U	U	R	U	U	U
Methapyrene	10	IND	IND	U	U	U	R	U	U	U
3-Methylcholanthrene	2.0	U	U	U	UJ	U	R	U	U	U
Methyl methanesulfonate	2.0	U	U	U	U	U	R	U	U	U
Naphthalene	4.5	UJ	UJ	46.3	U	U	R	U	85.6	U
1,4-Naphthoquinone	17	U	U	U	U	U	R	U	U	U
1-Naphthylamine	2.8	U	U	U	U	U	R	U	U	U
2-Naphthylamine	10	U	U	U	U	U	R	U	U	U
p-Nitroaniline	17	U	U	U	U	U	R	U	U	U
Nitrobenzene	3.2	569	7980 J	U	U	U	R	U	U	U
4-Nitrophenol	4.0	UJ	UJ	UJ	UJ	UJ	R	UJ	U	UJ
4-Nitroquinoline-N-oxide	-	IND	IND	U	U	U	R	U	U	U
N-Nitrosodiphenylamine	3.2	U	U	U	U	U	R	U	U	U
N-Nitrosodi-n-butylamine	17	UJ	UJ	U	U	U	R	U	U	U
N-Nitrosodiethylamine	17	U	U	U	U	U	R	U	U	UJ
N-Nitrosodimethylamine	17	U	U	U	U	U	R	U	U	U
N-Nitrosomethylethylamine	17	U	U	U	U	U	R	U	U	U

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION

Quant  
Limit  
ug/L

CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

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Dames and Moore Sample Number		FG-13GW	FG-14	FG-15GW	G302	G303	G305	G307	G308	G314
Laboratory Sample Number		HA6545	HA6544	HA6563	HA6567	HA6569	HA6556	HA6548	HA6558	HA6547
Sampling Date	Quant	12/02/91	12/02/91	12/09/91	12/10/91	12/09/91	12/09/91	12/05/91	12/10/91	12/05/91
Dilution Factor	Limit	20	200	50	1.0	1.0	1.0	1.0	1.0	25
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
APPENDIX IX SEMIVOLATILE COMPOUNDS (continued)										
N-Nitrosomorpholine	10	U	U	U	U	U	R	U	U	U
N-Nitrosopiperidine	10	UJ	UJ	U	U	U	R	U	U	U
N-Nitrosopyrrolodine	10	U	U	U	U	U	R	U	U	U
5-Nitro-o-toluidine	10	U	U	U	U	U	R	U	U	U
Pentachlorobenzene	10	U	U	2.6 J	U	U	R	U	U	U
Pentachloronitrobenzene	10	U	U	U	U	U	R	U	U	U
Pentachlorophenol	3.7	61.0	675	U	U	U	R	U	U	U
Phenacetin	10	U	U	U	U	U	R	U	U	U
Phenol	1.5	403 J	16800 J	90 J	UJ	UJ	R	UJ	553	64.1 J
m-phenylenediamine	10	U	U	U	U	U	R	U	U	U
o-phenylenediamine	10	U	U	U	U	U	R	U	U	U
p-phenylenediamine	10	U	U	U	U	U	R	U	U	U
2-Picoline	10	U	U	U	U	U	R	U	U	U
Pronamide	10	U	U	U	U	U	R	U	U	U
Pyridine	10	U	85 J	U	U	U	R	U	U	35
Safrole	10	U	U	U	U	U	R	U	U	U
1,2,4,5-Tetrachlorobenzene	10	U	U	U	U	U	R	U	U	U
2,3,4,6-Tetrachlorophenol	10	U	U	U	U	U	R	U	U	U
Tetraethyldithiopyrophospha	-	U	U	U	U	U	R	U	U	U
o-Toluidine	10	U	U	U	U	U	R	U	U	U
1,2,4-Trichlorobenzene	2.0	UJ	UJ	U	U	U	R	U	U	U
2,4,5-Trichlorophenol	10	U	U	U	U	U	R	U	2.9 J	U
2,4,6-Trichlorophenol	2.8	358	878	35.8	U	U	R	U	26.2	U
0,0,0-Triethyl phosphorothi	-	-	-	U	U	U	R	U	U	U
sym-Trinitrobenzene	-	IND	IND	U	U	U	R	U	U	U
Benzyl alcohol	10	U	U	U	U	U	R	U	U	U
Dibenzofuran	10	U	U	U	U	U	R	U	6.38 J	U
Isophorone	2.3	UJ	UJ	U	U	U	R	UJ	U	UJ
2-Methylnaphthalene	10	UJ	80.8 J	12.7	U	U	R	U	8.9 J	U
o-Nitroaniline	10	U	U	U	U	U	R	U	U	U
m-Nitroaniline	10	U	U	U	U	U	R	U	U	U
4-Chlorophenyl phenyl ether	4.3	U	U	U	U	U	R	U	U	U

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number Laboratory Sample Number Sampling Date Units	Quant Limit ug/L	FG-13GW HA6545 12/02/91 ug/L	FG-14 HA6544 12/02/91 ug/L	FG-15GW HA6563 12/09/91 ug/L	G302 HA6567 12/10/91 ug/L	G303 HA6569 12/09/91 ug/L	G305 HA6556 12/09/91 ug/L	G307 HA6548 12/05/91 ug/L	G308 HA6558 12/10/91 ug/L	G314 HA6547 12/05/91 ug/L
APPENDIX IX INORGANIC PARAMETERS										
Aluminum	60	U	U	U	U	U	U	U	U	BMDL JB
Arsenic	100	BMDL J	BMDL J	BMDL J	UJ	BMDL J	BMDL J	BMDL J	130 J	97
Barium	20	64	93	420	74	50	54	25	41	520
Beryllium	1.0	U	U	U	U	U	U	U	U	U
Cadmium	2.0	U	UJ	U	U	U	U	U	U	U
Chromium	10	U	U	U	U	U	U	BMDL J	U	U
Cobalt	20	U	U	U	U	U	26	U	U	U
Copper	10	U	BMDL J	BMDL JB	U	U	U	BMDL J	U	U
Lead	5.0	BMDL J	BMDL JB	BMDL JB	U	BMDL J	U	BMDL JB	BMDL JB	BMDL JB
Mercury	0.20	U	U	U	U	U	U	U	U	U
Nickel	20	43	BMDL J	48	BMDL J	U	U	U	30	39
Selenium	5.0	BMDL J	BMDL J	BMDL JB	BMDL J	U	UJ	33	BMDL J	BMDL JB
Silver	10	U	U	U	U	U	U	U	U	U
Thallium	10	U	U	U	U	U	UJ	U	UJ	U
Tin	50	U	U	U	U	U	U	U	U	U
Vanadium	20	U	U	U	U	U	U	BMDL J	BMDL J	U
Zinc	20	BMDL J	BMDL JB	U	U	U	U	U	BMDL JB	U

LEGEND:

- U Compound was not detected at laboratory method detection limit.
  - J Estimated value due to limitations identified during the quality assurance review.
  - UJ reported method detection limit is estimated due to limitations identified during the quality assurance review.
  - B Compound was detected in a laboratory and/or field blank at similar concentrations. May represent laboratory and/or field contamination.
  - R Unreliable result. Compound may or may not be present.
  - \* Sample analyzed at multiple dilutions. Summary table is a hybrid of diluted and undiluted results.
  - No standard available. Compound was qualitatively searched for.
  - IND Indeterminate. Standard and/or spikes could not be detected at method detection limit.
  - BMDL Below Method Detection Limit reported by laboratory.
- Discrepancies may exist between the laboratory data tables and the data validation summary tables due to variations in the rounding of calculations.

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number		G318	G324	G330	G332	G337	G342	GWDUP02	G343	G344
Laboratory Sample Number		HA6568	HA6568	HA6564	HA6554	HA6561	HA6550	HA6549	HA6552	HA6551
Sampling Date	Quant	12/10/91	12/10/91	12/09/91	12/05/91	12/09/91	12/05/91	12/05/91	12/09/91	12/05/91
Dilution Factor	Limit	1.0	1.0	1.0	2.5	1.0	2.5	2.5	1.0	2.0
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
APPENDIX IX HEATED P/T VOLATILE COMPOUNDS										
Acetonitrile	15	R	R	25.5 J	1560	R	UJ	UJ	0.41 J	63.9 J
Acrolein	20	R	R	R	R	R	R	R	R	R
Acrylonitrile	10	R	R	UJ	UJ	R	UJ	UJ	UJ	UJ
1,4-Dioxane	300	UJ	UJ	38 J	97.2 J	UJ	360 J	263 J	U	U
Ethyl cyanide	40	UJ	UJ	U	U	UJ	U	U	U	U
Isobutyl alcohol	230	UJ	UJ	U	2460	UJ	U	U	12.2 J	U
Methacrylonitrile	110	UJ	UJ	UJ	UJ	UJ	UJ	UJ	U	UJ

continued next page (see last page of table for notes)



TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number		G318	G324	G330	G332	G337	G342	GWDUP02	G343	G344
Laboratory Sample Number		HA0568	HA0568	HA0564	HA0554	HA0501	HA0550	HA0540	HA0552	HA0551
Sampling Date	Quant	12/10/91	12/10/91	12/09/91	12/05/91	12/09/91	12/05/91	12/05/91	12/09/91	12/05/91
Dilution Factor	Limit	1.0	1.0	1.0	10	1.0	5.0	1.0	1.0	10
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
APPENDIX IX P/T VOLATILE COMPOUNDS										
Benzene	4.4	U	18.3	37.6	428	U	30.0	30.9	U	137
Methyl bromide	10	U	U	U	U	U	U	U	U	U
Carbon disulfide	10	U	U	U	U	U	U	4.8 J	U	U
Chloroethane	10	U	U	U	U	U	U	U	U	U
Chlorobenzene	6.0	U	27.3	U	63.3	U	U	U	U	U
2-Chloro-1,3-butadiene	-	U	U	U	U	U	U	U	U	U
Chloroform	1.6	U	U	U	U	U	U	U	U	U
Methyl chloride	10	U	U	U	U	U	U	U	U	U
3-Chloropropene	10	U	U	U	U	U	U	U	U	U
1,2-Dibromo-3-chloropropan	10	U	U	U	U	U	U	U	U	U
1,2-Dibromoethane	10	U	U	U	U	U	U	U	U	U
Dibromoethane	10	U	U	U	U	U	U	U	U	U
1,4-Dichloro-2-butene	10	U	U	U	U	U	U	U	U	U
Dichlorodifluoromethane	10	U	U	U	U	U	U	U	U	U
1,1-Dichloroethane	4.7	U	U	11.4	U	U	U	U	U	U
1,2-Dichloroethane	2.8	U	U	U	U	U	U	U	U	U
1,2-Dichloroethene (trans)	1.6	U	U	61.9	U	U	U	U	U	U
1,1-Dichloroethene	2.8	U	U	237	2240 J	U	36.7	6.93	U	U
Methylene Chloride	2.8	U	U	U	1870	U	U	U	U	U
1,2-Dichloropropane	6.0	U	U	U	U	U	U	U	U	U
cis-1,3-Dichloropropene	5.0	U	U	U	U	U	U	33.9	U	U
trans-1,3-Dichloropropene	10	U	U	U	U	U	U	U	U	U
Chlorodibromomethane	3.1	U	U	U	U	U	U	U	U	U
Dichlorobromomethane	2.2	U	U	U	U	U	U	U	U	U
Ethyl methacrylate	10	U	U	U	U	U	U	U	U	U
Iodomethane	10	UJ	UJ	U	U	U	U	U	UJ	U
Methyl ethyl ketone	10	R	R	R	R	R	R	78.9 J	R	R
Methyl methacrylate	10	U	U	U	U	U	U	U	U	U
Pentachloroethane	-	U	U	U	U	U	U	U	U	U
1,1,1,2-Tetrachloroethane	6.9	U	U	U	U	U	U	U	U	U
1,1,2,2-Tetrachloroethane	4.1	U	U	U	U	U	6.58 J	U	U	U
Tetrachloroethene	4.1	U	U	U	U	U	U	U	U	U
Carbon Tetrachloride	2.8	U	U	U	U	U	U	U	U	U
Toluene	6.0	U	6.53	39.1	385	U	U	U	U	288
Bromoform	4.7	U	U	U	U	U	U	U	U	U
1,1,1-Trichloroethane	3.8	U	U	U	U	U	U	U	U	U
1,1,2-Trichloroethane	5.0	U	U	U	U	U	U	U	U	U
Trichloroethene	1.9	U	U	7.11	U	U	U	U	U	U
Trichlorofluoromethane	10	U	U	U	U	U	U	U	U	U

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number		G318	G324	G330	G332	G337	G342	GWDUP02	G343	G344
Laboratory Sample Number		HA6568	HA6566	HA6564	HA6554	HA6561	HA6550	HA6549	HA6552	HA6551
Sampling Date	Quant	12/10/91	12/10/91	12/09/91	12/05/91	12/09/91	12/05/91	12/05/91	12/09/91	12/05/91
Dilution Factor	Limit	1.0	1.0	1.0	10	1.0	5.0	1.0	1.0	10
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
APPENDIX IX SEMIVOLATILE COMPOUNDS										
Acetophenone	10	U	2.9 J	U	U	U	U	U	U	U
2-Acetylaminofluorene	10	U	U	U	U	U	U	U	U	U
4-Aminobiopheny	10	U	U	U	U	U	U	U	U	U
Aniline	10	UJ	UJ	UJ	UJ	UJ	U	U	UJ	706
Aramite	10	U	U	U	U	U	U	U	U	U
Benzo(A)anthracene	8.0	U	U	U	U	UJ	U	U	U	U
Benzo(b)fluoranthene	4.9	U	UJ	U	U	UJ	U	U	U	U
Benzo(a)pyrene	2.6	U	UJ	U	U	UJ	U	U	U	U
Bis(2-Chloroethoxy)methane	5.5	U	U	U	U	U	U	U	U	U
Bis(2-chloroethyl) ether	5.9	U	U	U	U	U	U	U	U	U
Bis(2-chloroisopropyl) ether	5.9	U	U	U	U	U	U	U	U	U
Bis(2-Ethylhexyl)phthalate	10	U	U	U	U	UJ	U	U	U	U
4-Bromophenylphenyl ether	2.0	U	U	U	U	U	U	U	U	U
Butylbenzylphthalate	10	UJ	U	UJ	UJ	UJ	UJ	UJ	UJ	UJ
2-sec-Butyl-4,6-dinitrophen	10	U	U	U	U	U	U	U	U	U
p-Chloraniline	10	U	U	U	11.6	U	UJ	UJ	U	4120 J
p-Chloro-m-cresol	3.1	U	U	U	U	U	U	U	6.23	U
2-Chloranaphthalene	2.0	U	U	U	U	U	U	U	U	U
2-Chlorophenol	3.4	U	5.2	37.5	64.8	U	1100	1380	8.52	541
Chrysene	2.6	U	U	U	U	UJ	U	U	U	U
Acenaphthene	2.0	U	4.64	U	U	U	U	U	U	4.98
Acenaphthylene	3.6	U	U	U	U	U	U	U	U	U
Anthracene	2.0	U	U	U	2.52	U	U	U	U	U
Benzo(ghi)perylene	3.2	U	UJ	U	U	UJ	U	U	U	U
Benzo(k)fluoranthene	2.8	U	UJ	U	U	UJ	U	U	U	U
Fluorene	2.0	U	2.8	U	U	U	U	U	U	4.85
Phenanthrene	5.6	U	4.8 J	U	U	U	U	U	U	2.78 J
Pyrene	2.0	U	U	U	U	UJ	U	U	U	U
2-Nitrophenol	3.7	U	U	U	U	U	U	U	8.12	U
o-Cresol	10	U	3.4 J	2.5 J	U	U	U	U	5.2 J	36
m+p-Cresols	10	U	19.2	78.8	6.01 J	U	U	6.67 J	5.4 J	37.6
Diallate	10	U	U	U	U	U	U	U	U	U
Dibenzo(a,h)anthracene	2.6	U	UJ	U	U	UJ	U	U	U	U
Di-n-butyl phthalate	10	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
1,2-Dichlorobenzene	2.0	U	U	U	U	U	U	U	U	U
1,3-Dichlorobenzene	2.0	U	U	U	U	U	U	U	U	U
1,4-Dichlorobenzene	4.5	U	U	U	U	U	U	U	U	U
3,3-Dichlorobenzidine	17	UJ	U	UJ	UJ	UJ	UJ	UJ	UJ	UJ
2,4-Dichlorophenol	2.8	U	UJ	53.2	U	U	U	57.2	20.4	345
2,6-Dichlorophenol	10	U	U	U	239	U	350	323	U	498

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number		G318	G324	G330	G332	G337	G342	GWDUP02	G343	G344
Laboratory Sample Number		HA0568	HA0566	HA0564	HA0554	HA0561	HA0550	HA0549	HA0552	HA0551
Sampling Date	Quant	12/10/91	12/10/91	12/09/91	12/05/91	12/09/91	12/05/91	12/05/91	12/09/91	12/05/91
Dilution Factor	Limit	1.0	1.0	1.0	10	1.0	5.0	1.0	1.0	10
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
APPENDIX IX SEMIVOLATILE COMPOUNDS (continued)										
Diethylphthalate	2.6	R	R	R	R	R	U	U	R	U
p-Dimethylaminoazobenzene	5.5	U	U	U	U	UJ	U	U	U	U
7,12-Dimethylbenzo(a)anthra	5.9	U	UJ	U	U	UJ	U	U	U	U
3,3-Dimethylbenzidine	5.9	U	U	R	U	U	U	U	R	U
a-a-Dimethylphenethylamine	10	U	-	1.13 J	U	-	U	-	-	-
2,4-Dimethylphenol	2.0	U	U	R	U	U	U	U	4.96	U
Dimethyl phthalate	10	R	R	U	R	R	U	U	R	U
m-Dinitrobenzene	10	U	U	U	U	U	U	U	U	U
4,6-Dinitro-0-cresol	10	U	U	UJ	U	U	UJ	U	4.5 J	U
2,4-Dinitrophenol	3.1	UJ	UJ	U	U	U	U	U	UJ	U
2,4-Dinitrotoluene	2.0	U	U	U	U	U	U	U	U	U
2,6-Dinitrotoluene	3.4	U	U	U	U	U	U	U	U	U
Di-n-octyl phthalate	2.6	U	UJ	U	U	UJ	U	U	U	U
Diphenylamine	2.0	U	U	UJ	U	U	U	U	U	U
N-nitrosodipropylamine	3.6	UJ	UJ	U	U	U	UJ	U	UJ	U
Ethyl methanesulfonate	2.0	U	U	U	U	U	U	U	U	U
Fluoranthene	3.2	U	U	UJ	U	U	U	U	U	U
Hexachlorobenzene	2.6	UJ	UJ	U	U	UJ	U	U	UJ	U
Hexachlorobutadiene	2.0	U	U	U	U	U	U	U	U	U
Hexachlorocyclopentadiene	5.6	U	U	U	U	U	U	U	U	U
Hexachloroethane	2.0	U	U	U	U	U	U	U	U	U
Isodrin	3.7	U	U	R	U	U	U	U	U	U
Hexachlorophene	10	R	R	U	R	R	U	R	U	R
Hexachloropropene	10	U	U	U	U	U	R	U	R	U
Indeno(1,2,3-c,d)pyrene	10	U	UJ	U	U	UJ	U	U	U	U
Isosafrole	2.6	U	U	U	U	U	U	U	U	U
Methapyrene	10	U	U	U	U	U	U	U	U	U
3-Methylcholanthrene	2.0	U	UJ	U	U	UJ	U	U	U	U
Methyl methanesulfonate	2.0	U	U	U	U	U	U	U	U	U
Naphthalene	4.5	U	16.7	5.99	25	U	U	U	U	74.8
1,4-Naphthoquinone	17	U	U	U	U	U	U	U	U	U
1-Naphthylamine	2.8	U	U	U	U	U	U	U	U	U
2-Naphthylamine	10	U	U	U	U	U	U	U	U	U
p-Nitroaniline	17	U	U	U	U	U	U	U	U	U
Nitrobenzene	3.2	U	U	U	U	U	U	U	U	U
4-Nitrophenol	4.0	UJ	U	UJ	UJ	UJ	R	UJ	UJ	UJ
4-Nitroquinoline-N-oxide	-	U	UJ	U	U	U	U	U	U	U
N-Nitrosodiphenylamine	3.2	U	U	U	U	U	U	U	U	U
N-Nitrosodi-n-butylamine	17	U	U	U	U	U	U	U	U	U
N-Nitrosodiethylamine	17	U	U	U	U	U	U	U	U	U
N-Nitrosodimethylamine	17	U	U	U	U	U	U	U	U	U
N-Nitrosomethylethylamine	17	U	U	U	U	U	U	U	U	U

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number		G318	G324	G330	G332	G337	G342	GWDUP02	G343	G344
Laboratory Sample Number		HA6568	HA6566	HA6564	HA6554	HA6561	HA6550	HA6549	HA6552	HA6551
Sampling Date	Quant	12/10/91	12/10/91	12/09/91	12/05/91	12/09/91	12/05/91	12/05/91	12/09/91	12/05/91
Dilution Factor	Limit	1.0	1.0	1.0	10	1.0	5.0	1.0	1.0	10
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
APPENDIX IX SEMIVOLATILE COMPOUNDS (continued)										
N-Nitrosomorpholine	10	U	U	U	U	U	U	U	U	U
N-Nitrosopiperidine	10	U	U	U	U	U	U	U	U	U
N-Nitrosopyrrolidine	10	U	U	U	U	U	U	U	U	U
5-Nitro-o-toluidine	10	U	U	U	U	U	U	U	U	U
Pentachlorobenzene	10	U	U	U	U	U	U	U	U	U
Pentachloronitrobenzene	10	U	U	U	U	U	U	U	U	U
Pentachlorophenol	3.7	U	U	U	U	U	U	U	9.06	712
Phenacetin	10	U	U	U	U	U	U	U	U	U
Phenol	1.5	U	59.5 J	77.9 J	2330 J	UJ	42200 J	51200 J	UJ	3383 J
m-phenylenediamine	10	U	U	U	U	U	U	U	U	U
o-phenylenediamine	10	U	U	U	U	U	U	U	U	U
p-phenylenediamine	10	U	U	U	U	U	U	U	U	U
2-Picoline	10	U	U	U	U	U	U	U	U	U
Pronamide	10	U	U	U	U	U	U	U	U	U
Pyridine	10	U	1.25 J	21.5	93	U	U	U	U	4.61 J
Safrole	10	U	U	U	U	U	U	U	U	U
1,2,4,5-Tetrachlorobenzene	10	U	U	U	U	U	U	U	U	U
2,3,4,6-Tetrachlorophenol	10	U	U	U	U	U	UJ	U	U	U
Tetraethyldithiopyrophospha	-	U	U	U	U	U	U	U	U	U
o-Toluidine	10	U	U	U	U	U	U	U	U	U
1,2,4-Trichlorobenzene	2.0	U	U	U	U	U	U	U	U	U
2,4,5-Trichlorophenol	10	U	U	U	4.15 J	U	U	U	7.6 J	U
2,4,6-Trichlorophenol	2.8	U	U	U	U	U	30.5	24.5	8.97	28.3
0,0,0-Triethyl phosphorothi	-	U	U	U	U	U	U	U	U	U
sym-Trinitrobenzene	-	U	U	U	U	U	U	U	U	U
Benzyl alcohol	10	U	U	U	U	U	U	U	U	U
Dibenzofuran	10	U	U	U	U	U	U	U	U	4 J
Isophorone	2.3	U	U	U	U	U	UJ	UJ	U	U
2-Methylnaphthalene	10	U	3.5 J	U	U	U	U	U	U	U
o-Nitroaniline	10	U	U	U	U	U	UJ	U	U	U
m-Nitroaniline	10	U	U	U	U	U	UJ	U	U	U
4-Chlorophenyl phenyl ether	4.3	U	U	U	U	U	U	U	U	U

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number Laboratory Sample Number Sampling Date Units	Quant Limit ug/L	G318 HA0508 12/10/91 ug/L	G324 HA0506 12/10/91 ug/L	G330 HA0504 12/09/91 ug/L	G332 HA0554 12/05/91 ug/L	G337 HA0501 12/09/91 ug/L	G342 HA0550 12/05/91 ug/L	GWDUP02 HA0549 12/05/91 ug/L	G343 HA0552 12/09/91 ug/L	G344 HA0551 12/05/91 ug/L
APPENDIX IX INORGANIC PARAMETERS										
Aluminum	60	U	U	U	U	BMDL JB	U	U	U	U
Arsenic	100	BMDL J	BMDL J	BMDL J	BMDL J	BMDL J	42	46	BMDL J	27
Barium	20	63	58	41	610	70	26	25	58	58
Beryllium	1.0	U	U	U	U	U	U	U	U	U
Cadmium	2.0	U	U	U	U	U	U	U	U	U
Chromium	10	U	U	U	U	U	U	U	U	U
Cobalt	20	U	U	U	U	U	U	U	U	U
Copper	10	U	U	U	U	U	U	U	U	U
Lead	5.0	U	U	BMDL JB	U	BMDL JB	BMDL JB	BMDL JB	BMDL JB	BMDL JB
Mercury	0.20	U	0.3	U	U	1.2	U	U	BMDL J	U
Nickel	20	U	BMDL J	BMDL J	47	U	BMDL J	BMDL J	U	31
Selenium	5.0	BMDL J	BMDL J	U	BMDL J	UJ	BMDL J	BMDL J	U	BMDL J
Silver	10	UJ	U	U	U	U	U	U	U	U
Thallium	10	U	U	U	U	UJ	U	U	UJ	U
Tin	50	U	U	U	U	U	U	U	U	U
Vanadium	20	U	BMDL J	U	U	U	29	23	U	U
Zinc	20	U	U	U	BMDL JB	U	U	U	U	BMDL JB

LEGEND:

- U Compound was not detected at laboratory method detection limit.
  - J Estimated value due to limitations identified during the quality assurance review.
  - UJ Reported method detection limit is estimated due to limitations identified during the quality assurance review.
  - B Compound was detected in a laboratory and/or field blank at similar concentrations. May represent laboratory and/or field contamination.
  - R Unreliable result. Compound may or may not be present.
  - \* Sample analyzed at multiple dilutions. Summary table is a hybrid of diluted and undiluted results.
  - No standard available. Compound was qualitatively searched for.
  - IND Indeterminate. Standard and/or spikes could not be detected at method detection limit.
  - BMDL Below Method Detection Limit reported by laboratory.
- Discrepancies may exist between the laboratory data tables and the data validation summary tables due to variations in the rounding of calculations.

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number		G347	G348	G349	GWFB02	GWFB03	TB120391	TB120591	TB120691	TB120991	TB121091
Laboratory Sample Number		HA6553	HA6562	HA6570	HA6584	HA6585	HA6591	HA6592	HA6593	HA6594	HA6595
Sampling Date	Quant	12/09/91	12/05/91	12/09/91	12/06/91	12/09/91	12/03/91	12/05/91	12/06/91	12/09/91	12/10/91
Dilution Factor	Limit	1.0	10	2.5	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
APPENDIX IX HEATED P/T VOLATILE COMPOUNDS											
Acetonitrile	15	UJ	UJ	101 J	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Acrolein	20	R	R	R	R	R	R	R	R	R	R
Acrylonitrile	10	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
1,4-Dioxane	300	U	U	U	U	UJ	U	U	U	UJ	UJ
Ethyl cyanide	40	U	U	U	U	UJ	U	U	U	UJ	UJ
Isobutyl alcohol	230	U	U	U	U	UJ	U	U	U	UJ	UJ
Methacrylonitrile	110	U	UJ	U	U	UJ	U	U	U	UJ	UJ

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number		G347	G348	G349	GWFB02	GWFB03	TB120391	TB120591	TB120691	TB120991	TB121091
Laboratory Sample Number		HA6553	HA6562	HA6570	HA6584	HA6585	HA6591	HA6592	HA6593	HA6594	HA6595
Sampling Date	Quant	12/09/91	12/05/91	12/09/91	12/06/91	12/09/91	12/03/91	12/05/91	12/06/91	12/09/91	12/10/91
Dilution Factor	Limit	1.0	2.5	25	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
APPENDIX IX P/T VOLATILE COMPOUNDS											
Benzene	4.4	U	119	132	U	U	U	U	U	U	U
Methyl bromide	10	U	U	U	U	U	U	U	U	U	U
Carbon disulfide	10	U	U	U	U	U	U	U	U	U	U
Chloroethane	10	U	U	U	U	U	U	U	U	U	U
Chlorobenzene	6.0	U	U	U	U	U	U	U	U	U	U
2-Chloro-1,3-butadiene	-	U	U	U	U	U	U	U	U	U	U
Chloroform	1.6	U	U	U	U	U	U	U	U	U	U
Methyl chloride	10	U	U	U	U	U	U	U	U	U	U
3-Chloropropene	10	U	U	U	U	U	U	U	U	U	U
1,2-Dibromo-3-chloropropane	10	U	U	U	U	U	U	U	U	U	U
1,2-Dibromoethane	10	U	U	U	U	U	U	U	U	U	U
Dibromoethane	10	U	U	U	U	U	U	U	U	U	U
1,4-Dichloro-2-butene	10	U	U	U	U	U	U	U	U	U	U
Dichlorodifluoromethane	10	U	U	U	U	U	U	U	U	U	U
1,1-Dichloroethane	4.7	U	U	U	U	U	U	U	U	U	U
1,2-Dichloroethane	2.8	U	66.2	U	U	U	U	U	U	U	U
1,2-Dichloroethene (trans)	1.6	U	U	U	U	U	U	U	U	U	U
1,1-Dichloroethene	2.8	U	43.4	U	U	U	U	U	U	U	U
Methylene Chloride	2.8	U	U	U	U	U	U	U	U	U	U
1,2-Dichloropropane	6.0	U	U	U	U	U	U	U	U	U	U
cis-1,3-Dichloropropene	5.0	U	U	U	U	U	U	U	U	U	U
trans-1,3-Dichloropropene	10	U	U	U	U	U	U	U	U	U	U
Chlorodibromomethane	3.1	U	U	U	U	U	U	U	U	U	U
Dichlorobromomethane	2.2	U	U	U	U	U	U	U	U	U	U
Ethyl methacrylate	10	U	U	U	U	U	U	U	U	U	U
Iodomethane	10	U	U	U	U	U	U	U	U	U	U
Methyl ethyl ketone	10	R	R	R	R	R	R	R	R	R	R
Methyl methacrylate	10	U	U	U	U	U	U	U	U	U	U
Pentachloroethane	-	U	U	U	U	U	U	U	U	U	U
1,1,1,2-Tetrachloroethane	6.9	U	U	U	U	U	U	U	U	U	U
1,1,1,2,2-Tetrachloroethane	4.1	U	U	U	U	U	U	U	U	U	U
Tetrachloroethene	4.1	U	U	326	U	U	U	U	U	U	U
Carbon Tetrachloride	2.8	U	U	U	U	U	U	U	U	U	U
Toluene	6.0	U	108	1500	U	U	U	U	U	U	U
Bromoform	4.7	U	U	U	U	U	U	U	U	U	U
1,1,1-Trichloroethane	3.8	U	18.0	U	U	U	U	U	U	U	U
1,1,2-Trichloroethane	5.0	U	40.8	U	U	U	U	U	U	U	U
Trichloroethene	1.9	U	U	U	U	U	U	U	U	U	U
Trichlorofluoromethane	10	U	U	U	U	U	U	U	U	U	U

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number		G347	G348	G349	GWFB02	GWFB03	TB120301	TB120501	TB120601	TB120901	TB121001
Laboratory Sample Number		HA6553	HA6562	HA6570	HA6584	HA6585	HA6591	HA6592	HA6593	HA6594	HA6595
Sampling Date	Quant	12/09/91	12/05/91	12/09/91	12/06/91	12/09/91	12/03/91	12/05/91	12/06/91	12/09/91	12/10/91
Dilution Factor	Limit	1.0	2.5	25	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
APPENDIX IX SEMIVOLATILE COMPOUNDS											
Acetophenone	10	U	U	7.1 J	U	U	NA	NA	NA	NA	NA
2-Acetylaminofluorene	10	U	U	U	U	U	NA	NA	NA	NA	NA
4-Aminobiopheny	10	U	UJ	U	U	U	NA	NA	NA	NA	NA
Aniline	10	UJ	2960	128 J	UJ	UJ	NA	NA	NA	NA	NA
Aramite	10	U	U	U	U	U	NA	NA	NA	NA	NA
Benzo(A)anthracene	8.0	U	UJ	U	U	U	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	4.9	U	UJ	U	U	U	NA	NA	NA	NA	NA
Benzo(a)pyrene	2.6	U	UJ	U	U	U	NA	NA	NA	NA	NA
Bis(2-Chloroethoxy)methane	5.5	U	U	U	U	U	NA	NA	NA	NA	NA
Bis(2-chloroethyl) ether	5.9	U	U	U	U	U	NA	NA	NA	NA	NA
Bis(2-chloroisopropyl)ether	5.9	U	U	U	U	U	NA	NA	NA	NA	NA
Bis(2-Ethylhexyl)phthalate	10	U	UJ	U	U	U	NA	NA	NA	NA	NA
4-Bromophenylphenyl ether	2.0	U	UJ	U	U	U	NA	NA	NA	NA	NA
Butylbenzylphthalate	10	UJ	UJ	UJ	UJ	UJ	NA	NA	NA	NA	NA
2-sec-Butyl-4,6-dinitrophen	10	U	U	U	U	U	NA	NA	NA	NA	NA
p-Chloraniline	10	U	8860	39.5	U	U	NA	NA	NA	NA	NA
p-Chloro-m-cresol	3.1	U	U	U	U	U	NA	NA	NA	NA	NA
2-Chloranaphthalene	2.0	U	U	U	U	U	NA	NA	NA	NA	NA
2-Chlorophenol	3.4	U	1590	52.1	U	U	NA	NA	NA	NA	NA
Chrysene	2.6	U	UJ	U	U	U	NA	NA	NA	NA	NA
Acenaphthene	2.0	U	U	U	U	U	NA	NA	NA	NA	NA
Acenaphthylene	3.6	U	U	U	U	U	NA	NA	NA	NA	NA
Anthracene	2.0	U	U	U	U	U	NA	NA	NA	NA	NA
Benzo(ghi)perylene	3.2	U	UJ	U	U	U	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	2.6	U	UJ	U	U	U	NA	NA	NA	NA	NA
Fluorene	2.0	U	UJ	U	U	U	NA	NA	NA	NA	NA
Phenanthrene	5.8	U	UJ	U	U	U	NA	NA	NA	NA	NA
Pyrene	2.0	U	UJ	U	U	U	NA	NA	NA	NA	NA
2-Nitrophenol	3.7	U	U	U	U	U	NA	NA	NA	NA	NA
o-Cresol	10	U	U	11.9	U	U	NA	NA	NA	NA	NA
m+p-Cresols	10	U	9.7 J	81.5	U	U	NA	NA	NA	NA	NA
Diallate	10	U	U	U	U	U	NA	NA	NA	NA	NA
Dibenzo(a,h)anthracene	2.6	U	UJ	U	U	U	NA	NA	NA	NA	NA
Di-n-butyl phthalate	10	UJ	UJ	UJ	UJ	UJ	NA	NA	NA	NA	NA
1,2-Dichlorobenzene	2.0	U	3.32	U	U	U	NA	NA	NA	NA	NA
1,3-Dichlorobenzene	2.0	U	U	U	U	U	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	4.5	U	U	U	U	U	NA	NA	NA	NA	NA
3,3-Dichlorobenzidine	17	UJ	UJ	UJ	UJ	UJ	NA	NA	NA	NA	NA
2,4-Dichlorophenol	2.8	U	635	294	U	U	NA	NA	NA	NA	NA
2,6-Dichlorophenol	10	U	U	U	U	U	NA	NA	NA	NA	NA

continued next page (see last page of table for notes)



**TABLE 2 (continued)**  
**SUMMARY OF ANALYTICAL RESULTS**  
**PHASE II INVESTIGATION**  
**CHEMICAL WASTE MANAGEMENT**  
**CHICAGO, ILLINOIS**

Dames and Moore Sample Number		G347	G348	G349	GWFB02	GWFB03	TB120391	TB120591	TB120691	TB120991	TB121091
Laboratory Sample Number		HA6553	HA6562	HA6570	HA6584	HA6585	HA6591	HA6592	HA6593	HA6594	HA6595
Sampling Date	Quant	12/09/91	12/05/91	12/09/91	12/06/91	12/09/91	12/03/91	12/05/91	12/06/91	12/09/91	12/10/91
Dilution Factor	Limit	1.0	2.5	25	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
<b>APPENDIX IX SEMIVOLATILE COMPOUNDS (continued)</b>											
Diethylphthalate	2.6	R	R	R	R	R	NA	NA	NA	NA	NA
p-Dimethylaminoazobenzene	5.5	U	UJ	U	U	U	NA	NA	NA	NA	NA
7,12-Dimethylbenzo(a)anthra	5.9	U	UJ	UJ	U	U	NA	NA	NA	NA	NA
3,3-Dimethylbenzidine	5.9	R	R	R	U	R	NA	NA	NA	NA	NA
a-a-Dimethylphenethylamine	10	-	-	-	-	-	NA	NA	NA	NA	NA
2,4-Dimethylphenol	2.0	U	U	U	U	U	NA	NA	NA	NA	NA
Dimethyl phthalate	10	R	R	R	R	R	NA	NA	NA	NA	NA
m-Dinitrobenzene	10	U	U	U	U	U	NA	NA	NA	NA	NA
4,6-Dinitro-0-cresol	10	U	UJ	U	U	U	NA	NA	NA	NA	NA
2,4-Dinitrophenol	3.1	UJ	UJ	U	UJ	UJ	NA	NA	NA	NA	NA
2,4-Dinitrotoluene	2.0	U	U	U	U	U	NA	NA	NA	NA	NA
2,6-Dinitrotoluene	3.4	U	U	U	U	U	NA	NA	NA	NA	NA
Di-n-octyl phthalate	2.6	U	U	U	U	U	NA	NA	NA	NA	NA
Diphenylamine	2.0	U	UJ	U	U	U	NA	NA	NA	NA	NA
N-nitrosodipropylamine	3.6	UJ	U	UJ	UJ	UJ	NA	NA	NA	NA	NA
Ethyl methanesulfonate	2.0	U	UJ	U	U	U	NA	NA	NA	NA	NA
Fluoranthene	3.2	U	U	U	U	U	NA	NA	NA	NA	NA
Hexachlorobenzene	2.6	UJ	U	U	U	UJ	NA	NA	NA	NA	NA
Hexachlorobutadiene	2.0	U	UJ	U	U	U	NA	NA	NA	NA	NA
Hexachlorocyclopentadiene	5.6	U	U	UJ	U	U	NA	NA	NA	NA	NA
Hexachloroethane	2.0	U	U	U	U	U	NA	NA	NA	NA	NA
Isodrin	3.7	U	U	U	U	U	NA	NA	NA	NA	NA
Hexachlorophene	10	R	R	R	R	UJ	NA	NA	NA	NA	NA
Hexachloropropene	10	U	U	U	U	U	NA	NA	NA	NA	NA
Indeno(1,2,3-c,d)pyrene	10	U	UJ	U	U	U	NA	NA	NA	NA	NA
Isosafrole	2.6	U	U	U	U	U	NA	NA	NA	NA	NA
Methapyrilene	10	U	U	U	U	U	NA	NA	NA	NA	NA
3-Methylcholanthrene	2.0	U	UJ	U	U	U	NA	NA	NA	NA	NA
Methyl methanesulfonate	2.0	U	U	U	U	U	NA	NA	NA	NA	NA
Naphthalene	4.5	U	25	62.1	U	U	NA	NA	NA	NA	NA
1,4-Naphthoquinone	17	U	U	U	U	U	NA	NA	NA	NA	NA
1-Naphthylamine	2.8	U	U	U	U	U	NA	NA	NA	NA	NA
2-Naphthylamine	10	U	U	U	U	U	NA	NA	NA	NA	NA
p-Nitroaniline	17	U	U	U	U	U	NA	NA	NA	NA	NA
Nitrobenzene	3.2	U	U	U	U	U	NA	NA	NA	NA	NA
4-Nitrophenol	4.0	UJ	UJ	UJ	UJ	UJ	NA	NA	NA	NA	NA
4-Nitroquinoline-N-oxide	-	U	U	U	U	U	NA	NA	NA	NA	NA
N-Nitrosodiphenylamine	3.2	U	UJ	U	U	U	NA	NA	NA	NA	NA
N-Nitrosodi-n-butylamine	17	U	U	U	U	U	NA	NA	NA	NA	NA
N-Nitrosodiethylamine	17	U	U	U	U	U	NA	NA	NA	NA	NA
N-Nitrosodimethylamine	17	U	U	U	U	U	NA	NA	NA	NA	NA
N-Nitrosomethylethylamine	17	U	U	U	U	U	NA	NA	NA	NA	NA

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number		G347	G348	G349	GWFB02	GWFB03	TB120391	TB120501	TB120601	TB120901	TB121091
Laboratory Sample Number		HA6553	HA6562	HA6570	HA6584	HA6585	HA6501	HA6502	HA6503	HA6504	HA6505
Sampling Date	Quant	12/09/91	12/05/91	12/09/91	12/06/91	12/09/91	12/03/91	12/05/91	12/06/91	12/09/91	12/10/91
Dilution Factor	Limit	1.0	2.5	25	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
APPENDIX IX SEMIVOLATILE COMPOUNDS (continued)											
N-Nitrosomorpholine	10	U	U	U	U	U	NA	NA	NA	NA	NA
N-Nitrosopiperidine	10	U	U	U	U	U	NA	NA	NA	NA	NA
N-Nitrosopyrrolidine	10	U	U	U	U	U	NA	NA	NA	NA	NA
5-Nitro-o-toluidine	10	U	U	U	U	U	NA	NA	NA	NA	NA
Pentachlorobenzene	10	U	U	U	U	U	NA	NA	NA	NA	NA
Pentachloronitrobenzene	10	U	UJ	U	U	U	NA	NA	NA	NA	NA
Pentachlorophenol	3.7	U	UJ	U	U	U	NA	NA	NA	NA	NA
Phenacetin	10	U	UJ	U	U	U	NA	NA	NA	NA	NA
Phenol	1.5	UJ	25.1 J	547	UJ	UJ	NA	NA	NA	NA	NA
m-phenylenediamine	10	U	U	U	U	U	NA	NA	NA	NA	NA
o-phenylenediamine	10	U	U	U	U	U	NA	NA	NA	NA	NA
p-phenylenediamine	10	U	U	U	U	U	NA	NA	NA	NA	NA
2-Picoline	10	U	U	U	U	U	NA	NA	NA	NA	NA
Pronamide	10	U	UJ	U	U	U	NA	NA	NA	NA	NA
Pyridine	10	U	5.3 J	1.2 J	U	U	NA	NA	NA	NA	NA
Safrole	10	U	U	U	U	U	NA	NA	NA	NA	NA
1,2,4,5-Tetrachlorobenzene	10	U	U	U	U	U	NA	NA	NA	NA	NA
2,3,4,6-Tetrachlorophenol	10	U	U	U	U	U	NA	NA	NA	NA	NA
Tetraethyldithiopyrophospha	-	U	U	U	U	U	NA	NA	NA	NA	NA
o-Toluidine	10	U	U	U	U	U	NA	NA	NA	NA	NA
1,2,4-Trichlorobenzene	2.0	U	U	U	U	U	NA	NA	NA	NA	NA
2,4,5-Trichlorophenol	10	U	26.8	U	U	U	NA	NA	NA	NA	NA
2,4,6-Trichlorophenol	2.8	U	14.5	6.5	U	U	NA	NA	NA	NA	NA
0,0,0-Triethyl phosphorothi	-	U	-	-	U	U	NA	NA	NA	NA	NA
sym-Trinitrobenzene	-	U	U	U	U	U	NA	NA	NA	NA	NA
Benzyl alcohol	10	U	U	U	U	U	NA	NA	NA	NA	NA
Dibenzofuran	10	U	U	U	U	U	NA	NA	NA	NA	NA
Isophorone	2.3	U	U	U	U	U	NA	NA	NA	NA	NA
2-Methylnaphthalene	10	U	3.8 J	U	U	U	NA	NA	NA	NA	NA
o-Nitroaniline	10	U	U	U	U	U	NA	NA	NA	NA	NA
m-Nitroaniline	10	U	U	U	U	U	NA	NA	NA	NA	NA
4-Chlorophenyl phenyl ether	4.3	U	U	U	U	U	NA	NA	NA	NA	NA

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number		G347	G348	G349	GWFB02	GWFB03	TB120391	TB120591	TB120691	TB120991	TB121091
Laboratory Sample Number	Quant	HA0553	HA0562	HA0570	HA0584	HA0585	HA0591	HA0592	HA0593	HA0594	HA0595
Sampling Date	Limit	12/09/91	12/05/91	12/09/91	12/06/91	12/09/91	12/03/91	12/05/91	12/06/91	12/09/91	12/10/91
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
APPENDIX IX INORGANIC PARAMETERS											
Aluminum	60	U	U	U	BMDL JB	BMDL J	NA	NA	NA	NA	NA
Arsenic	100	BMDL J	BMDL J	BMDL J	U	U	NA	NA	NA	NA	NA
Barium	20	180	110	91	U	U	NA	NA	NA	NA	NA
Beryllium	1.0	U	U	U	U	U	NA	NA	NA	NA	NA
Cadmium	2.0	U	U	U	U	U	NA	NA	NA	NA	NA
Chromium	10	U	U	U	U	BMDL J	NA	NA	NA	NA	NA
Cobalt	20	U	U	U	U	U	NA	NA	NA	NA	NA
Copper	10	U	U	U	U	BMDL J	NA	NA	NA	NA	NA
Lead	5.0	U	BMDL JB	BMDL JB	BMDL JB	U	NA	NA	NA	NA	NA
Mercury	0.20	U	U	BMDL J	U	U	NA	NA	NA	NA	NA
Nickel	20	U	BMDL J	BMDL J	U	U	NA	NA	NA	NA	NA
Selenium	5.0	UJ	BMDL J	BMDL J	U	U	NA	NA	NA	NA	NA
Silver	10	U	U	U	U	U	NA	NA	NA	NA	NA
Thallium	10	UJ	UJ	UJ	U	UJ	NA	NA	NA	NA	NA
Tin	50	U	U	U	U	U	NA	NA	NA	NA	NA
Vanadium	20	U	U	29	U	U	NA	NA	NA	NA	NA
Zinc	20	U	U	U	BMDL J	BMDL J	NA	NA	NA	NA	NA

LEGEND:

- U Compound was not detected at laboratory method detection limit.
- J Estimated value due to limitations identified during the quality assurance review.
- UJ Reported method detection limit is estimated due to limitations identified during the quality assurance review.
- B Compound was detected in a laboratory and/or field blank at similar concentrations. May represent laboratory and/or field contamination.
- R Unreliable result. Compound may or may not be present.
- \* Sample analyzed at multiple dilutions. Summary table is a hybrid of diluted and undiluted results.
- No standard available. Compound was qualitatively searched for.
- IND Indeterminate. Standard and/or spikes could not be detected at method detection limit.

BMDL Below Method Detection Limit reported by laboratory.

Discrepancies may exist between the laboratory data tables and the data validation summary tables due to variations in the rounding of calculations.



**DATA VALIDATION/QUALITY ASSURANCE REVIEW  
PHASE II RCRA FACILITY INVESTIGATION  
CHEM WASTE MANAGEMENT, INC. - CHICAGO INCINERATOR  
SAMPLE COLLECTION DATES: DECEMBER 10 - DECEMBER 12, 1991  
DAMES & MOORE JOB NO.: 13963-055-192**

**LABORATORY REPORT Nos.:101486 & 101490**

**INTRODUCTION**

Seven (7) groundwater samples, two (2) field-duplicate samples, two (2) vault samples, (1) field-blank samples and three (3) trip-blank samples were collected and submitted to Environmental Testing Corporation (ETC) of Edison, New Jersey (1992 Illinois Certification No. 100224). All samples included in this review are listed on Table 1. All groundwater samples, one (1) vault sample and the field-blank sample were analyzed for RCRA Appendix IX heated purge and trap volatile organic compounds (HP/T VOA), purge and trap volatile organic compounds (P/T VOA), semivolatile organic compounds (base/neutral and acid-extractable organic compounds) and metals. One (1) vault sample was analyzed for RCRA Appendix IX HP/T, P/T VOA, and semivolatile compounds only. Both vault samples were analyzed for RCRA Appendix IX organochlorine pesticides and polychlorinated biphenyls (PCB). The trip-blank samples were analyzed for RCRA Appendix IX HP/T and P/T volatile organic compounds only. All samples were analyzed following USEPA SW-846 Methodologies.

A data validation review was performed on all samples prepared under a modified CLP-SOW 3/90 CLP-I data deliverable format. Data were examined to assess the usability of the results, as well as to assess compliance relative to data package deliverable requirements. The organic data review is based upon a rigorous review of the reported hold times, surrogate recoveries, blank spike recoveries, matrix spike and matrix spike duplicate summaries, blank contaminants, internal standard area performance, Gas Chromatography (GC) calibration response factors, Gas Chromatography/Mass Spectroscopy (GC/MS) tuning and calibration data.

The inorganic data review is based on a review of the reported hold times, blank analysis results, blank spike recoveries, matrix spike and duplicate results, calibration results, post-digestion spike recoveries and Inductively Coupled Plasma (ICP) serial dilution analysis.

Details of the data validation/quality assurance review are presented in the narrative section of the report. The data is summarized in Table 2 of the report. Data qualifiers have been placed next to the results so that the data user can quickly assess the qualitative and/or quantitative reliability of the reported result. This report was prepared to provide a critical review of the laboratory analysis and reported chemical results. Quality assurance reviews of laboratory-generated data routinely identify problems

associated with analytical measurements, even from the most experienced and capable laboratories.

This review has been performed in accordance with the requirements specified in the "Laboratory Data Validation Functional Guidelines for Evaluating Organic Analyses" dated February 1988 and "Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses" dated July 1988.

**TABLE 1**  
**SAMPLES INCLUDED IN REVIEW**

<u>Sample ID</u>	<u>Lab ID</u>	<u>Date Collected</u>	<u>Test Requested</u>
<u>Log Link No. 101486</u>			
G317	HA6557	12/11/91	RCRA Appendix IX HP/T VOA, P/T VOA, BNA & Metals
G334	HA6559	12/11/91	RCRA Appendix IX HP/T VOA, P/T VOA, BNA & Metals
GWDUP04	HA6560	12/11/91	RCRA Appendix IX HP/T VOA, P/T VOA, BNA & Metals
G336	HA6565	12/11/91	RCRA Appendix IX HP/T VOA, P/T VOA, BNA & Metals
G123S	HA6575	12/11/91	RCRA Appendix IX HP/T VOA, P/T VOA, BNA & Metals
GWDUP03	HA6577	12/11/91	RCRA Appendix IX HP/T VOA, P/T VOA, BNA & Metals
GWFB121191	HA6586	12/11/91	RCRA Appendix IX HP/T VOA, P/T VOA, BNA & Metals
TB121191	HA6596	12/11/91	RCRA Appendix IX HP/T VOA & P/T VOA
<u>Log Link No. 101490</u>			
G121S	HA6573	12/12/91	RCRA Appendix IX HP/T VOA, P/T VOA, BNA & Metals
G124S	HA6576	12/12/91	RCRA Appendix IX HP/T VOA, P/T VOA, BNA & Metals
G120S	HA6580	12/12/91	RCRA Appendix IX HP/T VOA, P/T VOA, BNA & Metals
TB121291	HA6597	12/12/91	RCRA Appendix IX HP/T VOA & P/T VOA
TB121691	HA6598	12/12/91	RCRA Appendix IX HP/T VOA & P/T VOA
L-3	HA7043	12/10/91	RCRA Appendix IX HP/T VOA, P/T VOA, BNA & Pest/PCB
L-2	HA7045	12/11/91	RCRA Appendix IX HP/T VOA, P/T VOA, BNA, Pest/PCB & Metals

Legend:

HP/T VOA	=	RCRA Appendix IX Heated Purge and Trap Volatile Organic Compounds
P/T VOA	=	RCRA Appendix IX Purge and Trap Volatile Organic Compounds
BNA	=	RCRA Appendix IX Semivolatile Organic Compounds (Base/Neutral and Acid-Extractable Organic Compounds)
Pest/PCB	=	RCRA Appendix IX Organochlorine Pesticides and Polychlorinated Biphenyls

GENERAL COMMENTS

With regard to the data package deliverables, most of the requirements were met with the exception of the metals fraction. This reviewer has observed that for the ICP concentrations reported at 10 to 15 times above the method detection limit (MDL), the data validation cannot reproduce the laboratory reported results. The calculation obtained during data validation is consistently higher than the laboratory reported concentration. This is due to the fact that the interelement correction factors in the ICP instrument have been externally calculated. Since this external interelement correction factor is not available for review, the reported results for low level samples cannot be reproduced. It should be noted that positive ICP reported results that are significantly above than the MDL (approximately 100 times higher or more) were reproduced and validated, since this interelement correction factor becomes negligible at higher concentrations. The data review assumes that the low level reported concentrations (10 to 15 times the MDL) are correct as reported and it is this reviewer's opinion that data usability is not impacted.

DATA QUALIFIERS

The data validation review has identified aspects of the analytical data that require qualification. To confidently use any of the data within the data set, the data user should understand the limitations and qualifications presented. With regard to data usability, the following qualifiers are offered based upon the data provided.

ORGANIC QUALIFIERS

Hold Times:

- The trip-blank sample, TB121291, was analyzed for P/T VOA one (1) day outside the hold time requirement. There is no impact on data usability and no qualifier has been applied.

#### Blank Contamination:

- Trace presence of isobutyl alcohol in the heated purge and trap volatile (HP/T VOA) laboratory blank associated with samples G123S, GWDUP03 and L-3, has been identified at below the method detection limits (BMDL). The positive results of this compound in samples G123S and GWDUP03 are qualitatively questionable and have been flagged (B) on the summary tables, since its presence in the samples may be attributed to laboratory contamination. For sample L-3, however, the concentration of isobutyl alcohol is greater than 10 times the concentration found in the laboratory blank. This result is regarded as a "real" value and no qualifier has been applied.

#### Surrogate Recoveries:

- The semivolatile surrogate, terphenyl-d14, was recovered outside the control limits (low) for sample L-3 and may be biased low. No qualifier has been applied since only one surrogate per sample is outside the control limits.
- The base/neutral surrogate, 2-fluorobiphenyl, and the acid-extractable surrogate, 2,4,6-tribromophenol, were recovered outside the control limits (low for 2-fluorobiphenyl and less than 10% recovery for 2,4,6-tribromophenol) for sample L-2. The positive and non-detected base/neutral results may be biased low and have been flagged (J/UJ) estimated. The positive acid-extractable results for this sample may be biased low and have been flagged (J) estimated. The non-detected acid-extractable compounds, however, are regarded as unreliable and have been flagged (R) on the summary tables.
- The pesticide/PCB surrogates, dibutylchlorodate (DBC) and tetrachloro-m-xylene (TCX), were not recovered for samples L-2 and L-3. The results for both samples are regarded as unreliable and have been flagged (R) on the summary tables.

#### Internal Standard Area Performance:

- The area counts of the semivolatile internal standards, chrysene-d12 and perylene-d12, were outside the control limits (high) for sample G121S. The positive and non-detected compounds quantitated against these internal standards are regarded as estimated values and have been flagged (J/UJ) on the summary tables.



### Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Summary:

- The HP/T VOA blank spiking compounds, acrolein, acrylonitrile, 1,4-dioxane, ethyl cyanide and methacrylonitrile, associated with all samples, except for samples G317, G334 and GWDUP04, were recovered outside the control limits (low). The positive and non-detected results of these compounds in the associated samples may be biased low and have been flagged (J/UJ) estimated.
- The P/T VOA blank spiking compounds, methyl bromide, chloroethane, dichlorodifluoromethane, 1,1-dichloroethylene, methylene chloride, trans-1,3-dichloropropylene, toluene, vinyl chloride, acetone, ethylbenzene, styrene and m-xylene, associated with all samples, were recovered outside the control limits (low). The positive and non-detected results of these compounds may be biased low and have been flagged (J/UJ) estimated on the summary tables.
- The P/T VOA blank spiking compound, o&p-xylenes, was recovered less than 10%. The positive results of this compound maybe biased low and have been flagged (J) estimated. The non-detected results are regarded as unreliable and have been flagged (R) on the summary table.
- The semivolatile blank spike recoveries of benzo(a)anthracene, benzo(b)-fluoranthene, benzo(a)pyrene, bis(2-chloroethoxy)methane, bis(2-ethylhexyl)phthalate, chrysene, acenaphthene, anthracene, benzo(k)-fluoranthene, fluorene, phenanthrene, pyrene, 2,4-dinitrotoluene, 2,6-dinitrotoluene, di-n-octyl phthalate, fluoranthene, hexachlorobenzene, naphthalene, 1,2,4-trichlorobenzene, 2-methylnaphthalene and 4-chlorophenyl phenyl ether were outside the control limits (high). The positive results of these compounds may be biased high and have been flagged (J) estimated. There is no impact on the non-detected results and no qualifier has been applied.
- The semivolatile blank spiking compounds, p-chloroaniline, 3,3'-dichlorobenzidine, phenol, and m-nitroaniline, were recovered outside the control limits (low). The positive and non-detected results of these compounds may be biased low and have been flagged (J/UJ) estimated on the summary tables.
- The semivolatile blank spike recovery of aniline was less than 10%. The positive aniline results may be biased low and have been flagged (J) estimated. The non-detected aniline results are regarded as unreliable and have been flagged (R) on the summary tables.

- The base/neutral matrix spiking compound, 1,2,4-trichlorobenzene, was outside the control limits (high) for samples G120SMS/MSD and may be biased high. No qualifier has been applied since this compound was non-detected in the unspiked sample.
- Sample GWDUP04 was collected and submitted to the laboratory as a blind field-duplicate of sample G336. The reproducibility of the volatile and semivolatile organic results are good, providing a positive indication of the field techniques and laboratory precision associated with the samples.
- Sample GWDUP03 was collected and submitted to the laboratory as a blind field-duplicate sample of G123S. The reproducibility of the semivolatile results are good; however the reproducibility of the HP/T and P/T volatile organic results are poor. The positive and non-detected results for both HP/T and P/T volatiles for the field-duplicate samples, GWDUP003 and G123S are regarded as estimated values and have been flagged (J/UJ) on the summary tables.

#### Initial and Continuing Calibration Results:

- Samples G123S and GWDUP03 were re-analyzed for HP/T VOA and samples G317, G123S and G121S were re-analyzed at higher dilutions for P/T VOA due to target compounds concentrations exceeding the linear calibration range requirements. The results of these samples are a hybrid of both initial and dilution analyses as reported on Table 2.
- Sample L-2 was analyzed for P/T VOA at 1:250 dilution, resulting in elevated detection limits due to target compound concentrations exceeding the linear calibration range requirements.
- Samples G123S, GWDUP03, L-3 and L-2 were re-analyzed at higher dilutions for semivolatile organic compounds due to target compound concentrations exceeding the linear calibration range requirements. The semivolatile results for these samples are a hybrid of both initial and dilution analyses as reported on Table 2.
- Due to the high difference between the initial and continuing calibrations response factors ( $\%D > 25\%$  and  $< 90\%$ ), all positive results for the following volatile compounds have been flagged (J) estimated. The actual detection limit may be higher than reported and have been flagged (UJ) estimated on the summary table.

<u>Compound</u>	<u>Log Link</u>	<u>Associated Sample</u>
All HP/T VOA Cmpds.	101486	G317 & GWDUP04
All HP/T VOA Cmpds., except for Acrylonitrile	101486 101490	G336, G123S & GWDUP03 G1121S, G124S, TB121291, L-3 & L-2
All HP/T VOA Cmpds., except for Acrolein	101486 101490	TB121191 G120S & TB121691

- Due to the high difference between the initial and continuing calibration response factors (%D > 25% and <90%), all positive results for the following semivolatile compounds have been flagged (J) estimated. The actual detection limit may be higher than reported and have been flagged (UJ) estimated on the summary table.

<u>Compound</u>	<u>Log Link</u>	<u>Associated Sample</u>
N-Nitrosodi-n-propylamine, 2,4-Dinitrophenol, 2,3,4,6-Tetrachlorophenol, 4-Nitrophenol & Diethyl phthalate	101486 101490	G334, GWDUP04 & GWFB121191 G120S
Hexachlorobenzene & 3,3'-Dichlorobenzidine	101486 101490	G317, GWDUP03 & G1235 G121S, G124S, L-3 & L-2
Benzyl Alcohol	101486	G336

- The response factors of the P/T volatile compound, methyl ethyl ketone (MEK) and the semivolatile compound, hexachlorophene, in the initial and continuing calibrations associated with all samples are less than 0.05. The positive results of these compounds may be biased low and have been flagged (J) estimated. The non-detected results are regarded as unreliable and have been flagged (R) on the summary tables.

#### Additional Comments:

- As per the requirements, all values calculated below the method detection limit should be considered estimated and have been flagged (J) on the data table.

## INORGANIC PARAMETER QUALIFIERS

### Hold Times:

- All samples were digested and analyzed within the required hold time criteria for the metals analyses.

### Blank Contamination:

- Trace presence of lead, selenium, silver and zinc have been identified in the groundwater field-blank sample, GWFB121191 at below the method detection limits (BMDL). The positive results of these analytes in the groundwater samples reported as BMDL are qualitatively questionable and have been flagged (B) on the summary tables. The positive results of these analytes reported above the method detection limits (MDL) are regarded as "real" values and no qualifier has been applied.

### Instrument Calibration and Verification:

- The initial and continuing calibration verification recoveries of all metals were reported within control limits.

### ICP Serial Dilution Results:

- The percent differences (%D) of the ICP serial dilution analytes of sample G120S were reported within control limits.

### Matrix Spike (MS) and Duplicate (DU) Summary:

- The blank spike recovery of mercury, associated with samples G121S, G124S and L-2 was outside the control limits (high) and may be biased high. There is no impact on the data quality for the non-detected mercury results and no qualifier has been applied.
- The matrix spike recoveries of mercury and selenium in sample G120S was outside the control limits (low). The non-detected mercury and selenium results in the unspiked sample may be biased low and have been flagged (UJ) estimated on the summary tables.
- Sample GWDUP04 was collected and submitted to the laboratory as a blind field-duplicate of sample G336. The reproducibility of the metals results are good, providing a positive indication of the field techniques and laboratory precision associated with the samples.

- Sample GWDUP03 was collected and submitted to the laboratory as a blind field-duplicate of sample G1235. The reproducibility of the metals results are poor. The positive and non-detected metals results for the field-duplicate samples GWDUP03 and G1235 are regarded as estimated values and have been flagged (J/UJ) on the summary tables.

#### Post-Digestion Spike Recoveries:

- The post-spike recoveries of the following analytes were recovered outside the control limits (low). Positive and non-detected results of these analytes for the associated samples may be biased low and have been flagged (J/UJ) estimated.

<u>Analyte</u>	<u>Log Link</u>	<u>Associated Sample</u>
Arsenic	101486 101490	G334, GWDUP04, G336, G1235 & GWDUP03 G121S & L-2
Selenium	101486 101490	G317, G334, GWDUP04, G336, GWDUP03 & GWFB- 121191 G124S & G120S
Thallium	101486 101490	G317, G334, GWDUP04, G336, G1235 & GWDUP03 G120S, G121S, G124S & L-2

#### Additional Comments:

- The laboratory reports several inorganic results as below the method detection limit (BMDL). These are reported as BMDL on Table 2. The actual concentrations are not calculated during the data validation review since the interelement coefficient factors were not provided.

TABLE 2  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample No.		L-2	L-3	G120S	G121S	G123S	GWDUPO3	G124S	G317
Sampling Depth (ft)		5-8'	3-5'	NP	NP	NP	NP	NP	NP
Laboratory Sample Number		HA-7045	HA-7043	HA-6580	HA-6573	HA-6575	HA-6577	HA-6576	HA-6557
Sampling Date	Quant	12/11/92	12/10/92	12/12/93	12/12/93	12/11/93	12/11/93	12/12/93	12/11/93
Dilution Factor	Limit	10	2	1	1	1/25	5/125	1	1
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
APPENDIX IX HEATED P/T VOLATILE COMPOUNDS									
Acetonitrile	15	197 J	130 J	UJ	UJ	5640 J*	9830 J	UJ	6.1 J
Acrolein	20	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Acrylonitrile	10	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
1,4-Dioxane	300	1990 J	316 J	UJ	33.6 J	128 J	26.8 J	UJ	UJ
Ethyl cyanide	40	UJ	UJ	UJ	UJ	12.1 J	UJ	UJ	UJ
Isobutyl alcohol	230	UJ	656 J	92.5 JB	UJ	33.4 JB	9.33 JB	UJ	UJ
Methacrylonitrile	110	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample No. Laboratory Sample Number		L-2 HA-7045	L-3 HA-7043	G120S HA-6580	G121S HA-6573	G123S HA-6575	GWDUPO3 HA-6577	G124S HA-6576	G317 HA-6557
Sampling Date	Quant	12/11/92	12/10/92	12/12/93	12/12/93	12/11/93	12/11/93	12/12/93	12/11/93
Dilution Factor	Limit	250	10	1	1/2	1/2	5	1	1
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
APPENDIX IX P/T VOLATILE COMPOUNDS									
Acetone	10	UJ	942 J	UJ	UJ	196 J	169 J	UJ	398 J
Benzene	4.4	10700	94.9	U	262 *	312 *	316	U	113
Bromoform	4.7	U	U	U	U	U	U	U	U
Carbon disulfide	10	U	U	U	U	34.7	30 J	U	U
Carbon Tetrachloride	2.8	U	U	U	U	U	U	U	U
Chlorobenzene	6.0	7170	18.8 J	U	64.6	U	U	U	6.64
2-Chloro-1,3-butadiene	-	U	U	U	U	U	U	U	U
Chlorodibromomethane	3.1	U	U	U	U	U	U	U	U
Chloroethane	10	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Chloroform	1.6	U	U	U	U	U	U	U	U
3-Chloropropene	10	U	U	UJ	U	U	U	U	U
Dichlorobromomethane	2.2	U	U	U	U	U	U	U	U
Dichlorodifluoromethane	10	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
1,2-Dibromo-3-chloropropane	10	U	U	U	U	U	U	U	U
1,2-Dibromoethane	10	U	U	U	U	U	U	U	U
1,4-Dichloro-2-butene	10	U	U	U	U	U	U	U	U
1,1-Dichloroethane	4.7	U	233	U	U	U	U	U	4.6 J
1,2-Dichloroethane	2.8	U	U	U	U	U	U	U	U
1,1-Dichloroethene	2.8	UJ	183 J	UJ	UJ	3.56 J	UJ	UJ	34.8 J
1,2-Dichloropropane	6.0	U	U	U	U	U	U	U	U
cis-1,3-Dichloropropene	5.0	U	U	U	U	U	U	U	U
trans-1,3-Dichloropropene	10	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Ethylbenzene	7.2	R	UJ	UJ	14.6 J	2.8 J	U	UJ	UJ
Ethyl methacrylate	10	U	U	U	U	U	U	U	U
2-Hexanone	10	U	U	U	U	U	U	U	U
Iodomethane	10	U	U	U	U	U	U	U	U
Methyl bromide	10	R	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Methyl chloride	10	U	U	U	U	U	U	U	U
Methylene Chloride	2.8	1280 J	512 J	UJ	UJ	UJ	UJ	UJ	33.1 J
Methyl isobutyl ketone	10	U	273	U	U	105	104	U	U
Methyl ethyl ketone	10	R	R	R	R	43.4 J	R	R	45 J
Methyl methacrylate	10	U	U	U	U	U	U	U	U
Pentachloroethane	-	U	U	U	U	U	U	U	U
Styrene	10	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
1,1,2,2-Tetrachloroethane	4.1	U	U	U	U	U	U	U	U
Tetrachloroethene	4.1	U	U	U	U	U	U	U	U

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample No.		L-2	L-3	G120S	G121S	G123S	GWDUPO3	G124S	G317
Laboratory Sample Number		HA-7045	HA-7043	HA-6580	HA-6573	HA-6575	HA-6577	HA-6576	HA-6557
Sampling Date	Quant	12/11/92	12/10/92	12/12/93	12/12/93	12/11/93	12/11/93	12/12/93	12/11/93
Dilution Factor	Limit	250	10	1	1/2	1/2	5	1	1
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
APPENDIX IX P/T VOLATILE COMPOUNDS (continued)									
Toluene	6.0	7310 J	85.5 J	UJ	7.8 J	59.3 J	50.2 J	UJ	12.3 J
1,2-Dichloroethene (trans)	1.6	U	U	U	U	U	U	U	U
1,1,1-Trichloroethane	3.8	U	U	U	U	U	U	U	U
1,1,2-Trichloroethane	5.0	U	U	U	U	U	U	U	U
1,2,3-Trichloropropane	10	U	U	U	U	U	U	U	U
Trichloroethene	1.9	U	U	U	U	U	U	U	U
Trichlorofluoromethane	10	U	U	U	U	U	U	U	U
Vinyl acetate	10	U	U	U	U	U	U	U	U
Vinyl Chloride	10	UJ	UJ	UJ	UJ	33.3 J	UJ	UJ	UJ
m-Xylene	10	R	52 J	UJ	UJ	3.3 J	UJ	UJ	UJ
o,p-Xylenes	10	R	48.5 J	R	11	5.8 J	R	R	2.3 J

continued next page (see last page of table for notes)



TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample No.		L-2	L-3	G120S	G121S	G123S	GWDUPO3	G124S	G317
Laboratory Sample Number		HA-7045	HA-7043	HA-6580	HA-6573	HA-6575	HA-6577	HA-6576	HA-6557
Sampling Date	Quant	12/11/92	12/10/92	12/12/93	12/12/93	12/11/93	12/11/93	12/12/93	12/11/93
Dilution Factor	Limit	11	13	1	1	1	1	1	1.1
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
APPENDIX IX SEMIVOLATILE COMPOUNDS									
Acetophenone	10	UJ	U	U	U	U	U	U	12.6
2-Acetylamino fluorene	10	UJ	U	U	U	U	U	U	U
4-Aminobiphenyl	10	UJ	U	U	U	U	U	U	U
Aniline	10	R	R	R	R	2.8 J	28.9 J	R	R
Aramite	10	UJ	U	U	U	U	U	U	U
Benzo(a)anthracene	8.0	158 J	58.2 J	U	UJ	U	U	U	U
Benzo(b)fluoranthene	4.9	169 J	73.1 J	U	UJ	U	U	U	U
Benzo(a)pyrene	2.6	109 J	39.5 J	U	UJ	U	U	U	U
Bis(2-Chloroethoxy)methane	5.5	UJ	U	U	U	U	U	U	U
Bis(2-chloroethyl) ether	5.9	UJ	U	U	U	U	U	U	U
Bis(2-chloroisopropyl) ether	5.9	UJ	U	U	U	U	U	U	U
Bis(2-Ethylhexyl)phthalate	10	UJ	250 J	U	UJ	U	U	U	U
4-Bromophenylphenyl ether	2.0	UJ	U	U	U	U	U	U	U
Butylbenzylphthalate	10	UJ	U	U	UJ	U	U	U	U
2-sec-Butyl-4,6-dinitrophen	10	UJ	U	U	U	U	U	U	U
p-Chloroaniline	10	214 J	UJ	UJ	68.5 J	UJ	UJ	UJ	UJ
p-Chloro-m-cresol	3.1	R	U	U	U	U	U	U	U
2-Chloronaphthalene	2.0	UJ	U	U	U	U	U	U	U
2-Chlorophenol	3.4	195 J	824	U	1.9 J	2.5 J	U	U	5.21
Chrysene	2.6	183 J	47.7 J	U	UJ	U	U	U	U
Acenaphthene	2.0	59.5 J	39.4 J	4.23 J	2.28 J	U	U	U	2.22
Acenaphthylene	3.6	UJ	U	U	U	U	U	U	U
Anthracene	2.0	126 J	34.1 J	U	U	U	U	U	U
Benzo(ghi)perylene	3.2	56.4 J	U	U	UJ	U	U	U	U
Benzo(k)fluoranthene	2.6	UJ	U	U	UJ	U	U	U	U
Fluorene	2.0	175 J	54.4 J	4.73 J	U	U	U	U	1.8 J
Phenanthrene	5.6	680 J	184 J	3.1 J	U	U	U	U	3.4 J
Pyrene	2.0	400 J	132 J	U	UJ	U	U	U	U
2-Nitrophenol	3.7	R	U	U	U	U	U	U	U
o-Cresol	10	R	4150	U	U	65 J	6.8 J	U	U
m+p-Cresols	10	2570 J	U	U	U	80.5	92.6	U	26.3
Diallate	10	UJ	U	U	U	U	U	U	U
Dibenzo(a,h)anthracene	2.6	UJ	U	U	UJ	U	U	U	U
Di-n-butyl phthalate	10	UJ	U	U	U	U	10.1 J	U	52.7
1,2-Dichlorobenzene	2.0	UJ	U	U	5.18	U	U	U	U
1,3-Dichlorobenzene	2.0	UJ	U	U	U	U	U	U	U
1,4-Dichlorobenzene	4.5	UJ	U	U	U	U	U	U	U
3,3-Dichlorobenzidine	17	UJ	UJ	UJ	UJ	UJ	UJ	UJ	UJ
2,4-Dichlorophenol	2.8	1070 J	4320	U	U	U	U	U	340
2,6-Dichlorophenol	10	R	U	U	U	U	U	U	U

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample No. Laboratory Sample Number		L-2 HA-7045	L-3 HA-7043	G120S HA-6580	G121S HA-6573	G123S HA-6575	GWDUPO3 HA-6577	G124S HA-6576	G317 HA-6557
Sampling Date	Quant	12/11/92	12/10/92	12/12/93	12/12/93	12/11/93	12/11/93	12/12/93	12/11/93
Dilution Factor	Limit	11	13	1	1	1	1	1	1.1
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
APPENDIX IX SEMIVOLATILE COMPOUNDS (continued)									
Diethylphthalate	10	UJ	U	U	U	U	U	U	U
p-Dimethylaminobenzene	10	UJ	U	U	UJ	U	U	U	U
7,12-Dimethylbenzo(a)anthra	10	UJ	U	U	UJ	U	U	U	U
3,3-Dimethylbenzidine	10	UJ	U	U	U	U	U	U	U
a-a-Dimethylphenethylamine	-	-	-	-	-	-	-	-	-
2,4-Dimethylphenol	2.8	114 J	144	U	U	U	U	U	U
Dimethyl phthalate	10	UJ	U	U	U	U	U	U	U
m-Dinitrobenzene	10	UJ	U	U	U	U	U	U	U
4,6-Dinitro-0-cresol	25	R	U	U	U	U	U	U	U
2,4-Dinitrophenol	43	R	U	UJ	U	U	U	U	U
2,4-Dinitrotoluene	5.9	UJ	U	U	U	U	U	U	U
2,6-Dinitrotoluene	2.0	UJ	U	U	U	U	U	U	U
Di-n-octyl phthalate	10	UJ	U	U	UJ	U	U	U	U
Diphenylamine	10	UJ	U	U	U	U	U	U	U
N-nitrosodimethylamine	10	UJ	U	U	U	U	U	U	U
Ethyl methanesulfonate	10	UJ	U	U	U	U	U	U	U
Fluoranthene	2.3	392 J	125 J	U	U	U	U	U	U
Hexachlorobenzene	2.0	195 J	212 J	U	UJ	UJ	UJ	UJ	UJ
Hexachlorobutadiene	0.93	UJ	U	U	U	U	U	U	U
Hexachlorocyclopentadiene	10	UJ	U	U	U	U	U	U	U
Hexachloroethane	1.6	UJ	U	U	U	U	U	U	U
Isodrin	6.1	UJ	U	U	U	U	U	U	U
Hexachlorophene	10	R	R	U	R	R	R	R	R
Hexachloropropene	10	UJ	U	R	U	U	U	U	U
Indeno(1,2,3-c,d)pyrene	3.8	53.4	U	U	UJ	U	U	U	U
Isosafrole	10	UJ	U	U	U	U	U	U	U
Methapyrene	-	IND	IND	IND	IND	IND	IND	IND	IND
3-Methylcholanthrene	5.7	UJ	U	U	UJ	U	U	U	U
Methyl methanesulfonate	10	UJ	U	U	U	U	U	U	U
Naphthalene	1.6	405 J	139 J	1.5 J	12 J	10.6 J	11.1	U	9.22 J
1,4-Naphthoquinone	10	R	U	U	U	U	U	U	U
1-Naphthylamine	10	UJ	U	U	U	U	U	U	U
2-Naphthylamine	10	UJ	U	U	U	U	U	U	U
p-Nitroaniline	10	UJ	U	U	U	U	U	U	U
Nitrobenzene	2.0	UJ	U	U	U	U	U	U	U
4-Nitrophenol	2.5	R	U	UJ	U	U	U	U	U
4-Nitroquinoline-N-oxide	-	IND	IND	IND	IND	IND	IND	IND	IND
N-Nitrosodiphenylamine	2.0	UJ	U	U	U	U	U	U	U
N-Nitrosodi-n-butylamine	10	UJ	U	U	U	U	U	U	U
N-Nitrosodiethylamine	10	UJ	U	U	U	U	U	U	U
N-Nitrosodimethylamine	10	UJ	U	U	U	U	U	U	U
N-Nitrosomethylethylamine	10	UJ	U	U	U	U	U	U	U

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample No.		L-2	L-3	G120S	G121S	G123S	GWDUPO3	G124S	G317
Laboratory Sample Number		HA-7045	HA-7043	HA-6580	HA-6573	HA-6575	HA-6577	HA-6576	HA-6557
Sampling Date	Quant	12/11/92	12/10/92	12/12/93	12/12/93	12/11/93	12/11/93	12/12/93	12/11/93
Dilution Factor	Limit	11	13	1	1	1	1	1	1.1
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
APPENDIX IX SEMIVOLATILE COMPOUNDS (continued)									
N-Nitrosomorpholine	10	UJ	U	U	U	U	U	U	U
N-Nitrosopiperidine	10	UJ	U	U	U	U	U	U	U
N-Nitrosopyrrolidine	10	UJ	U	U	U	U	U	U	U
5-Nitro-o-toluidine	10	UJ	U	U	U	U	U	U	U
Pentachlorobenzene	10	UJ	28.5 J	U	U	U	U	U	U
Pentachloronitrobenzene	10	UJ	U	U	U	U	U	U	U
Pentachlorophenol	3.7	R	U	U	U	U	U	U	U
Phenacetin	10	UJ	U	U	U	U	U	U	U
Phenol	1.5	5520 J	10600 J	UJ	UJ	1810 J	1730 J	UJ	183 J
m-phenylenediamine	10	UJ	U	U	U	U	U	U	U
o-phenylenediamine	10	UJ	U	U	U	U	U	U	U
p-phenylenediamine	10	UJ	U	U	U	U	U	U	U
2-Picoline	10	UJ	U	U	U	U	U	U	U
Pronamide	10	UJ	U	U	U	U	U	U	U
Pyridine	10	175 J	U	U	U	709	724	U	U
Safrole	10	UJ	U	U	U	U	U	U	U
1,2,4,5-Tetrachlorobenzene	10	UJ	U	U	U	U	U	U	U
2,3,4,6-Tetrachlorophenol	10	R	U	UJ	U	U	U	U	U
Tetraethyldithiopyrophosphat	-	UJ	U	U	U	U	U	U	U
o-Toluidine	10	UJ	U	U	U	U	U	U	U
1,2,4-Trichlorobenzene	2.0	UJ	U	U	U	U	U	U	U
2,4,5-Trichlorophenol	10	R	U	U	U	U	U	U	U
2,4,6-Trichlorophenol	2.8	R	92.6	U	U	U	U	U	U
0,0,0-Triethyl phosphorothi	-	-	-	-	-	-	-	-	-
sym-Trinitrobenzene	-	IND	IND	IND	IND	IND	IND	IND	IND
Benzyl alcohol	10	UJ	U	U	U	U	U	U	U
Dibenzofuran	10	UJ	U	U	U	U	U	U	U
Isophorone	2.3	UJ	U	U	U	U	U	U	U
2-Methylnaphthalene	10	430 J	90.9 J	4.9 J	U	U	U	U	2.6 J
o-Nitroaniline	10	UJ	U	U	U	U	U	U	U
m-Nitroaniline	10	UJ	UJ	UJ	UJ	U	UJ	UJ	UJ
4-Chlorophenyl phenyl ether	4.3	UJ	U	U	U	U	U	U	U

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample No. Laboratory Sample Number Sampling Date Dilution Factor Units	Quant Limit ug/L	L-2 HA-7045 12/11/92 ug/L	L-3 HA-7043 12/10/92 ug/L	G120S HA-6580 12/12/93 ug/L	G121S HA-6573 12/12/93 ug/L	G123S HA-6575 12/11/93 ug/L	GWDUPO3 HA-6577 12/11/93 ug/L	G124S HA-6576 12/12/93 ug/L	G317 HA-6557 12/11/93 ug/L
APPENDIX IX PESTICIDE COMPOUNDS									
Alpha-BHC	0.55	R	R	NA	NA	NA	NA	NA	NA
Chlordane	10	R	R	NA	NA	NA	NA	NA	NA
Chlorobenzilate	25	R	R	NA	NA	NA	NA	NA	NA
4,4'-DDD	1.0	R	R	NA	NA	NA	NA	NA	NA
4,4'-DDE	1.0	R	R	NA	NA	NA	NA	NA	NA
4,4'-DDT	1.0	R	R	NA	NA	NA	NA	NA	NA
Dieldrin	1.0	R	R	NA	NA	NA	NA	NA	NA
Endosulfan I	0.55	R	R	NA	NA	NA	NA	NA	NA
Endosulfan II	1.0	R	R	NA	NA	NA	NA	NA	NA
Endosulfan Sulfate	1.0	R	R	NA	NA	NA	NA	NA	NA
Endrin	1.0	R	R	NA	NA	NA	NA	NA	NA
Endrin Aldehyde	1.0	R	R	NA	NA	NA	NA	NA	NA
Hepatchlor	0.55	R	R	NA	NA	NA	NA	NA	NA
Hepatchlor Epoxide	0.55	R	R	NA	NA	NA	NA	NA	NA
Beta-BHC	0.55	R	R	NA	NA	NA	NA	NA	NA
Delta-BHC	0.55	R	R	NA	NA	NA	NA	NA	NA
Gamma-BHC (Lindane)	0.55	R	R	NA	NA	NA	NA	NA	NA
Kepone	5.5	R	R	NA	NA	NA	NA	NA	NA
Methoxychlor	5.5	R	R	NA	NA	NA	NA	NA	NA
Toxaphene	20	R	R	NA	NA	NA	NA	NA	NA
Arochlor-1016	5.0	R	R	NA	NA	NA	NA	NA	NA
Arochlor-1221	5.0	R	R	NA	NA	NA	NA	NA	NA
Arochlor-1232	5.0	R	R	NA	NA	NA	NA	NA	NA
Arochlor-1242	5.0	R	R	NA	NA	NA	NA	NA	NA
Arochlor-1248	5.0	R	R	NA	NA	NA	NA	NA	NA
Arochlor-1254	10	R	R	NA	NA	NA	NA	NA	NA
Arochlor-1260	10	R	R	NA	NA	NA	NA	NA	NA
Thionazin	1.0	R	R	NA	NA	NA	NA	NA	NA
Dimethoate	2.5	R	R	NA	NA	NA	NA	NA	NA
Disulfoton	0.55	R	R	NA	NA	NA	NA	NA	NA
Methyl parathion	1.0	R	R	NA	NA	NA	NA	NA	NA
Parathion	1.0	R	R	NA	NA	NA	NA	NA	NA
Phorate	2.5	R	R	NA	NA	NA	NA	NA	NA
Famphur	10	R	R	NA	NA	NA	NA	NA	NA

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample No.		L-2	L-3	G120S	G121S	G123S	GWDUPO3	G124S	G317
Laboratory Sample Number	Quant	HA-7045	HA-7043	HA-6580	HA-6573	HA-6575	HA-6577	HA-6576	HA-6557
Sampling Date	Limit	12/11/92	12/10/92	12/12/93	12/12/93	12/11/93	12/11/93	12/12/93	12/11/93
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
APPENDIX IX INORGANIC PARAMETERS									
Antimony	60	BMDL J	NA	BMDL J	U	BMDL J	U	U	BMDL J
Arsenic	10	BMDL J	NA	41	BMDL J	BMDL J	BMDL J	U	BMDL J
Barium	20	470	NA	830	410	1300	1400	65	1700
Beryllium	1.0	3.1	NA	BMDL J	BMDL J	BMDL J	BMDL J	U	BMDL J
Cadmium	2.0	4.5	NA	BMDL J	U	BMDL J	U	U	U
Chromium	10	220	NA	U	BMDL J	U	U	BMDL J	U
Cobalt	20	34	NA	U	U	U	U	U	U
Copper	10	29	NA	BMDL J	BMDL J	BMDL J	BMDL J	BMDL J	BMDL J
Lead	5.0	170	NA	U	U	7.4	BMDL JB	BMDL JB	BMDL JB
Mercury	0.20	U	NA	UJ	U	U	U	U	U
Nickel	20	580	NA	BMDL J	29	21	BMDL J	BMDL J	31
Selenium	5.0	BMDL JB	NA	UJ	U	BMDL JB	BMDL JB	BMDL JB	UJ
Silver	10	BMDL JB	NA	BMDL JB	U	BMDL JB	U	BMDL JB	U
Thallium	10	UJ	NA	U	UJ	UJ	UJ	UJ	UJ
Tin	50	480	NA	250	220	180	170	81	BMDL J
Vanadium	20	49	NA	U	U	U	U	U	U
Zinc	20	1700	NA	BMDL JB	U	U	U	U	BMDL JB

LEGEND:

- U Compound was not detected at laboratory method detection limit.
- J Estimated value due to limitations identified during the quality assurance review.
- UJ eported method detection limit is estimated due to limitations identified during the quality assurance review.
- B Compound was detected in a laboratory and/or field blank at similar concentrations. May represent laboratory and/or field contamination.
- R Unreliable result. Compound may or may not be present.
- \* Sample analyzed at multiple dilutions. Summary table is a hybrid of diluted and undiluted results.
- No standard available. Compound was qualitatively searched for.
- NA Not analyzed
- NP Not provided
- IND Indeterminate. Standard and/or spikes could not be detected at method detection limit.
- BMDL Below Method Detection Limit reported by the laboratory

Discrepancies may exist between the laboratory data tables and the data validation summary tables due to variations in the rounding of calculations.

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample No.		G334	G336	GWDUPO4	GWFB04	TB121191	TB121291	TB121691
Sampling Depth (ft)		NP	NP	NP	NA	NA	NA	NA
Laboratory Sample Number		HA-6559	HA-6565	HA-6560	HA-6586	HA-6596	HA-6597	HA-6598
Sampling Date	Quant	12/11/93	12/11/93	12/11/93	12/11/93	12/6/93	12/11/93	12/10/93
Dilution Factor	Limit	1	1	1	1	1	1	1
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
APPENDIX IX HEATED P/T								
Acetonitrile	15	U	UJ	UJ	U	UJ	UJ	UJ
Acrolein	20	U	UJ	UJ	UJ	UJ	UJ	UJ
Acrylonitrile	10	U	UJ	UJ	UJ	UJ	UJ	UJ
1,4-Dioxane	300	U	UJ	UJ	UJ	UJ	UJ	UJ
Ethyl cyanide	40	U	UJ	UJ	UJ	UJ	UJ	UJ
Isobutyl alcohol	230	U	UJ	UJ	UJ	UJ	UJ	UJ
Methacrylonitrile	110	U	UJ	UJ	UJ	UJ	UJ	UJ

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample No. Laboratory Sample Number Sampling Date Dilution Factor Units	Quant Limit ug/L	G334 HA-6559 12/11/93 1 ug/L	G336 HA-6565 12/11/93 1 ug/L	GW DUPO4 HA-6560 12/11/93 1 ug/L	GWFB04 HA-6586 12/11/93 1 ug/L	TB121191 HA-6596 12/6/93 1 ug/L	TB121291 HA-6597 12/11/93 1 ug/L	TB121691 HA-6598 12/10/93 1 ug/L
APPENDIX IX P/T								
Acetone	10	UJ	UJ	UJ	U	UJ	U	U
Benzene	4.4	U	69.0	65.2	UJ	U	U	U
Bromoform	4.7	U	U	U	U	UJ	UJ	UJ
Carbon disulfide	10	U	U	U	U	U	U	U
Carbon Tetrachloride	2.8	U	U	U	U	U	U	U
Chlorobenzene	6.0	U	8.11	7.36	U	U	U	U
2-Chloro-1,3-butadiene	-	U	U	U	U	U	U	U
Chlorodibromomethane	3.1	U	U	U	U	U	U	U
Chloroethane	10	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Chloroform	1.6	U	U	U	U	U	U	U
3-Chloropropene	10	U	U	U	U	U	U	U
Dichlorobromomethane	2.2	U	U	U	U	U	U	U
Dichlorodifluoromethane	10	UJ	UJ	UJ	UJ	UJ	UJ	UJ
1,2-Dibromo-3-chloropropane	10	U	U	U	U	U	U	U
1,2-Dibromoethane	10	U	U	U	U	U	U	U
1,4-Dichloro-2-butene	10	U	U	U	U	U	U	U
1,1-Dichloroethane	4.7	U	U	U	U	U	U	U
1,2-Dichloroethane	2.8	U	U	U	U	U	U	U
1,1-Dichloroethene	2.8	UJ	UJ	UJ	UJ	UJ	UJ	UJ
1,2-Dichloropropane	6.0	U	U	U	U	U	U	U
cis-1,3-Dichloropropene	5.0	U	U	U	U	U	U	U
trans-1,3-Dichloropropene	10	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Ethylbenzene	7.2	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Ethyl methacrylate	10	U	U	U	U	U	U	U
2-Hexanone	10	U	U	U	U	U	U	U
Iodomethane	10	U	U	U	U	U	U	U
Methyl bromide	10	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Methyl chloride	10	U	U	U	U	U	U	U
Methylene Chloride	2.8	UJ	UJ	UJ	UJ	UJ	UJ	UJ
Methyl isobutyl ketone	10	U	U	U	U	U	U	U
Methyl ethyl ketone	10	R	R	R	R	R	R	R
Methyl methacrylate	10	U	U	U	U	U	U	U
Pentachloroethane	-	U	U	U	U	U	U	U
Styrene	10	UJ	UJ	UJ	UJ	UJ	UJ	UJ
1,1,2,2-Tetrachloroethane	4.1	U	U	U	U	U	U	U
Tetrachloroethene	4.1	U	U	U	U	U	U	U

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample No. Laboratory Sample Number Sampling Date Dilution Factor Units	Quant Limit ug/L	G334 HA-6559 12/11/93 1 ug/L	G336 HA-6565 12/11/93 1 ug/L	GWDUPO4 HA-6560 12/11/93 1 ug/L	GWFB04 HA-6586 12/11/93 1 ug/L	TB121191 HA-6596 12/6/93 1 ug/L	TB121291 HA-6597 12/11/93 1 ug/L	TB121691 HA-6598 12/10/93 1 ug/L
APPENDIX IX P/T								
Toluene	6.0	UJ	UJ	UJ	UJ	U	UJ	UJ
1,2-Dichloroethene (trans)	1.6	U	U	U	U	U	U	U
1,1,1-Trichloroethane	3.8	U	U	U	U	U	U	U
1,1,2-Trichloroethane	5.0	U	U	U	U	U	U	U
1,2,3-Trichloropropane	10	U	U	U	U	U	U	U
Trichloroethene	1.9	U	U	U	U	U	U	U
Trichlorofluoromethane	10	U	U	U	U	U	U	U
Vinyl acetate	10	U	U	U	U	U	U	U
Vinyl Chloride	10	UJ	UJ	UJ	UJ	UJ	UJ	UJ
m-Xylene	10	UJ	UJ	UJ	UJ	UJ	UJ	UJ
o,p-Xylenes	10	R	R	R	R	R	R	R

continued next page (see last page of table for notes)



TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample No.		G334	G336	GW DUPO4	GWFB04	TB121191	TB121291	TB121691
Laboratory Sample Number		HA-6559	HA-6565	HA-6560	HA-6586	HA-6596	HA-6597	HA-6598
Sampling Date	Quant	12/11/93	12/11/93	12/11/93	12/11/93	12/6/93	12/11/93	12/10/93
Dilution Factor	Limit	1.1	1	1.1	1	NA	NA	NA
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
APPENDIX IX SEMIVOLATILE COMPOUNDS								
Acetophenone	10	U	U	U	U	NA	NA	NA
2-Acetylaminofluorene	10	U	U	U	U	NA	NA	NA
4-Aminobiphenyl	10	U	U	U	U	NA	NA	NA
Aniline	10	R	R	R	R	NA	NA	NA
Aramid	10	U	U	U	U	NA	NA	NA
Benzo(A)anthracene	8.0	U	U	U	U	NA	NA	NA
Benzo(b)fluoranthene	4.9	U	U	U	U	NA	NA	NA
Benzo(a)pyrene	2.6	U	U	U	U	NA	NA	NA
Bis(2-Chloroethoxy)methane	5.5	U	U	U	U	NA	NA	NA
Bis(2-chloroethyl) ether	5.9	U	U	U	U	NA	NA	NA
Bis(2-chloroisopropyl)ether	5.9	U	U	U	U	NA	NA	NA
Bis(2-Ethylhexyl)phthalate	10	U	U	U	U	NA	NA	NA
4-Bromophenylphenyl ether	2.0	U	U	U	U	NA	NA	NA
Butylbenzylphthalate	10	U	U	U	U	NA	NA	NA
2-sec-Butyl-4,6-dinitrophen	10	U	U	U	U	NA	NA	NA
p-Chloroaniline	10	UJ	UJ	UJ	UJ	NA	NA	NA
p-Chloro-m-cresol	3.1	U	U	U	U	NA	NA	NA
2-Chloronaphthalene	2.0	U	U	U	U	NA	NA	NA
2-Chlorophenol	3.4	U	U	U	U	NA	NA	NA
Chrysene	2.6	U	U	U	U	NA	NA	NA
Acenaphthene	2.0	U	2.53 J	U	U	NA	NA	NA
Acenaphthylene	3.6	U	U	2.12 J	U	NA	NA	NA
Anthracene	2.0	U	U	U	U	NA	NA	NA
Benzo(ghi)perylene	3.2	U	U	U	U	NA	NA	NA
Benzo(k)fluoranthene	2.6	U	U	U	U	NA	NA	NA
Fluorene	2.0	U	U	U	U	NA	NA	NA
Phenanthrene	5.6	U	U	U	U	NA	NA	NA
Pyrene	2.0	U	U	U	U	NA	NA	NA
2-Nitrophenol	3.7	U	U	U	U	NA	NA	NA
o-Cresol	10	U	U	U	U	NA	NA	NA
m+p-Cresols	10	U	U	U	U	NA	NA	NA
Dallate	10	U	U	U	U	NA	NA	NA
Dibenzo(a,h)anthracene	2.6	U	U	U	U	NA	NA	NA
Di-n-butyl phthalate	10	U	U	33	U	NA	NA	NA
1,2-Dichlorobenzene	2.0	U	U	U	U	NA	NA	NA
1,3-Dichlorobenzene	2.0	U	U	U	U	NA	NA	NA
1,4-Dichlorobenzene	4.5	U	U	U	U	NA	NA	NA
3,3-Dichlorobenzidine	17	UJ	UJ	UJ	UJ	NA	NA	NA
2,4-Dichlorophenol	2.8	UJ	UJ	UJ	UJ	NA	NA	NA
2,6-Dichlorophenol	10	U	U	U	U	NA	NA	NA

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample No. Laboratory Sample Number Sampling Date Dilution Factor Units	Quant Limit ug/L	G334 HA-6559 12/11/93 1.1 ug/L	G336 HA-6565 12/11/93 1 ug/L	GWDUPO4 HA-6560 12/11/93 1.1 ug/L	GWFB04 HA-6586 12/11/93 1 ug/L	TB121191 HA-6596 12/6/93 NA ug/L	TB121291 HA-6597 12/11/93 NA ug/L	TB121691 HA-6598 12/10/93 NA ug/L
APPENDIX IX SEMIVOLATILE COMPOUNDS (continued)								
Diethylphthalate	10	U	U	U	U	NA	NA	NA
p-Dimethylaminobenzene	10	U	U	U	U	NA	NA	NA
7,12-Dimethylbenzo(a)anthra	10	U	U	U	U	NA	NA	NA
3,3-Dimethylbenzidine	10	U	U	U	U	NA	NA	NA
a-a-Dimethylphenethylamine	-	-	-	-	-	NA	NA	NA
2,4-Dimethylphenol	2.8	U	U	U	U	NA	NA	NA
Dimethyl phthalate	10	U	U	U	U	NA	NA	NA
m-Dinitrobenzene	10	U	U	U	U	NA	NA	NA
4,6-Dinitro-0-cresol	25	U	U	U	U	NA	NA	NA
2,4-Dinitrophenol	43	U	U	U	U	NA	NA	NA
2,4-Dinitrotoluene	5.9	U	U	U	U	NA	NA	NA
2,6-Dinitrotoluene	2.0	U	U	U	U	NA	NA	NA
Di-n-octyl phthalate	10	U	U	U	U	NA	NA	NA
Diphenylamine	10	U	U	U	U	NA	NA	NA
N-nitrosodipropylamine	10	U	U	U	U	NA	NA	NA
Ethyl methanesulfonate	10	U	U	U	U	NA	NA	NA
Fluoranthene	2.3	U	U	U	U	NA	NA	NA
Hexachlorobenzene	2.0	U	U	U	U	NA	NA	NA
Hexachlorobutadiene	0.93	U	U	U	U	NA	NA	NA
Hexachlorocyclopentadiene	10	U	U	U	U	NA	NA	NA
Hexachloroethane	1.6	U	U	U	U	NA	NA	NA
Isodrin	6.1	U	U	U	U	NA	NA	NA
Hexachlorophene	10	U	R	R	R	NA	NA	NA
Hexachloropropene	10	R	U	U	U	NA	NA	NA
Indeno(1,2,3-c,d)pyrene	3.8	U	U	U	U	NA	NA	NA
Isosafrole	10	U	U	U	U	NA	NA	NA
Methapyrene	-	IND	IND	IND	IND	NA	NA	NA
3-Methylcholanthrene	5.7	U	U	U	U	NA	NA	NA
Methyl methanesulfonate	10	U	U	U	U	NA	NA	NA
Naphthalene	1.6	U	U	U	U	NA	NA	NA
1,4-Naphthoquinone	10	U	U	U	U	NA	NA	NA
1-Naphthylamine	10	U	U	U	U	NA	NA	NA
2-Naphthylamine	10	U	U	U	U	NA	NA	NA
p-Nitraniline	10	U	U	U	U	NA	NA	NA
Nitrobenzene	2.0	U	U	U	U	NA	NA	NA
4-Nitrophenol	2.5	U	U	U	U	NA	NA	NA
4-Nitroquinoline-N-oxide	-	IND	IND	IND	IND	NA	NA	NA
N-Nitrosodiphenylamine	2.0	U	U	U	U	NA	NA	NA
N-Nitrosodi-n-butylamine	10	U	U	U	U	NA	NA	NA
N-Nitrosodimethylamine	10	U	U	U	U	NA	NA	NA
N-Nitrosomethylamine	10	U	U	U	U	NA	NA	NA

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample No. Laboratory Sample Number Sampling Date Dilution Factor Units	Quant Limit ug/L	G334 HA-6559 12/11/93 1.1 ug/L	G336 HA-6565 12/11/93 1 ug/L	GWDUPO4 HA-6560 12/11/93 1.1 ug/L	GWFB04 HA-6586 12/11/93 1 ug/L	TB121191 HA-6596 12/6/93 NA ug/L	TB121291 HA-6597 12/11/93 NA ug/L	TB121691 HA-6598 12/10/93 NA ug/L
APPENDIX IX SEMIVOLATILE COMPOUNDS (continued)								
N-Nitrosomorpholine	10	U	U	U	U	NA	NA	NA
N-Nitrosopiperidine	10	U	U	U	U	NA	NA	NA
N-Nitrosopyrrolidine	10	U	U	U	U	NA	NA	NA
5-Nitro-o-toluidine	10	U	U	U	U	NA	NA	NA
Pentachlorobenzene	10	U	U	U	U	NA	NA	NA
Pentachloronitrobenzene	10	U	U	U	U	NA	NA	NA
Pentachlorophenol	3.7	U	U	U	U	NA	NA	NA
Phenacetin	10	U	U	U	U	NA	NA	NA
Phenol	1.5	UJ	UJ	UJ	UJ	NA	NA	NA
m-phenylenediamine	10	U	U	U	U	NA	NA	NA
o-phenylenediamine	10	U	U	U	U	NA	NA	NA
p-phenylenediamine	10	U	U	U	U	NA	NA	NA
2-Picoline	10	U	U	U	U	NA	NA	NA
Pronamide	10	U	U	U	U	NA	NA	NA
Pyridine	10	U	U	U	U	NA	NA	NA
Safrole	10	U	U	U	U	NA	NA	NA
1,2,4,5-Tetrachlorobenzene	10	U	U	U	U	NA	NA	NA
2,3,4,6-Tetrachlorophenol	10	UJ	U	UJ	UJ	NA	NA	NA
Tetraethyldithiopyrophosphat	-	U	U	U	U	NA	NA	NA
o-Toluidine	10	U	U	U	U	NA	NA	NA
1,2,4-Trichlorobenzene	2.0	U	U	U	U	NA	NA	NA
2,4,5-Trichlorophenol	10	U	U	U	U	NA	NA	NA
2,4,6-Trichlorophenol	2.8	U	U	U	U	NA	NA	NA
0,0,0-Triethyl phosphorothi	-	-	-	-	-	NA	NA	NA
sym-Trinitrobenzene	-	IND	IND	IND	IND	NA	NA	NA
Benzyl alcohol	10	U	UJ	U	U	NA	NA	NA
Dibenzofuran	10	U	U	U	U	NA	NA	NA
Isophorone	2.3	U	U	U	U	NA	NA	NA
2-Methylnaphthalene	10	U	U	U	U	NA	NA	NA
o-Nitroaniline	10	U	U	U	U	NA	NA	NA
m-Nitroaniline	10	UJ	UJ	UJ	UJ	NA	NA	NA
4-Chlorophenyl phenyl ether	4.3	U	U	U	U	NA	NA	NA

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample No. Laboratory Sample Number Sampling Date Dilution Factor Units	Quant Limit ug/L	G334 HA-6559 12/11/93 NA ug/L	G336 HA-6565 12/11/93 NA ug/L	GWDUPO4 HA-6560 12/11/93 NA ug/L	GWPB04 HA-6586 12/11/93 NA ug/L	TB121191 HA-6596 12/6/93 NA ug/L	TB121291 HA-6597 12/11/93 NA ug/L	TB121691 HA-6598 12/10/93 NA ug/L
APPENDIX IX PESTICIDE COMPOUNDS								
Alpha-BHC	0.55	NA	NA	NA	NA	NA	NA	NA
Chlordane	10	NA	NA	NA	NA	NA	NA	NA
Chlorobenzilate	25	NA	NA	NA	NA	NA	NA	NA
4,4'-DDD	1.0	NA	NA	NA	NA	NA	NA	NA
4,4'-DDE	1.0	NA	NA	NA	NA	NA	NA	NA
4,4'-DDT	1.0	NA	NA	NA	NA	NA	NA	NA
Dieldrin	1.0	NA	NA	NA	NA	NA	NA	NA
Endosulfan I	0.55	NA	NA	NA	NA	NA	NA	NA
Endosulfan II	1.0	NA	NA	NA	NA	NA	NA	NA
Endosulfan Sulfate	1.0	NA	NA	NA	NA	NA	NA	NA
Endrin	1.0	NA	NA	NA	NA	NA	NA	NA
Endrin Aldehyde	1.0	NA	NA	NA	NA	NA	NA	NA
Hepatchlor	0.55	NA	NA	NA	NA	NA	NA	NA
Hepatchlor Epoxide	0.55	NA	NA	NA	NA	NA	NA	NA
Beta-BHC	0.55	NA	NA	NA	NA	NA	NA	NA
Delta-BHC	0.55	NA	NA	NA	NA	NA	NA	NA
Gamma-BHC (Lindane)	0.55	NA	NA	NA	NA	NA	NA	NA
Kepone	5.5	NA	NA	NA	NA	NA	NA	NA
Methoxychlor	5.5	NA	NA	NA	NA	NA	NA	NA
Toxaphene	20	NA	NA	NA	NA	NA	NA	NA
Arochlor-1016	5.0	NA	NA	NA	NA	NA	NA	NA
Arochlor-1221	5.0	NA	NA	NA	NA	NA	NA	NA
Arochlor-1232	5.0	NA	NA	NA	NA	NA	NA	NA
Arochlor-1242	5.0	NA	NA	NA	NA	NA	NA	NA
Arochlor-1248	5.0	NA	NA	NA	NA	NA	NA	NA
Arochlor-1254	10	NA	NA	NA	NA	NA	NA	NA
Arochlor-1260	10	NA	NA	NA	NA	NA	NA	NA
Thionazin	1.0	NA	NA	NA	NA	NA	NA	NA
Dimethoate	2.5	NA	NA	NA	NA	NA	NA	NA
Disulfoton	0.55	NA	NA	NA	NA	NA	NA	NA
Methyl parathion	1.0	NA	NA	NA	NA	NA	NA	NA
Parathion	1.0	NA	NA	NA	NA	NA	NA	NA
Phorate	2.5	NA	NA	NA	NA	NA	NA	NA
Famphur	10	NA	NA	NA	NA	NA	NA	NA

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample No.		G334	G336	GWDUPO4	GWFB04	911211TB	911212TB	911216TB
Laboratory Sample Number	Quant	HA-6559	HA-6565	HA-6560	HA-6586	HA-6596	HA-6597	HA-6598
Sampling Date	Limit	12/11/93	12/11/93	12/11/93	12/11/93	12/6/93	12/11/93	12/10/93
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
<b>APPENDIX IX INORGANIC PARAMETERS</b>								
Antimony	60	U	U	U	U	NA	NA	NA
Arsenic	10	BMDL J	BMDL J	BMDL J	U	NA	NA	NA
Barium	20	47	86	95	U	NA	NA	NA
Beryllium	1.0	U	U	U	U	NA	NA	NA
Cadmium	2.0	U	BMDL J	U	U	NA	NA	NA
Chromium	10	U	BMDL J	U	U	NA	NA	NA
Cobalt	20	U	U	U	U	NA	NA	NA
Copper	10	BMDL J	BMDL J	BMDL J	U	NA	NA	NA
Lead	5.0	U	U	U	BMDL J	NA	NA	NA
Mercury	0.20	U	U	U	U	NA	NA	NA
Nickel	20	U	BMDL J	BMDL J	U	NA	NA	NA
Selenium	5.0	BMDL JB	BMDL JB	BMDL JB	BMDL J	NA	NA	NA
Silver	10	BMDL JB	BMDL JB	U	BMDL J	NA	NA	NA
Thallium	10	UJ	UJ	UJ	U	NA	NA	NA
Tin	50	52	190	210	U	NA	NA	NA
Vanadium	20	U	U	U	U	NA	NA	NA
Zinc	20	U	BMDL JB	U	BMDL J	NA	NA	NA

**LEGEND:**

- U Compound was not detected at laboratory method detection limit.
  - J Estimated value due to limitations identified during the quality assurance review.
  - UJ Reported method detection limit is estimated due to limitations identified during the quality assurance review.
  - B Compound was detected in a laboratory and/or field blank at similar concentrations. May represent laboratory and/or field contamination.
  - R Unreliable result. Compound may or may not be present.
  - \* Sample analyzed at multiple dilutions. Summary table is a hybrid of diluted and undiluted results.
  - No standard available. Compound was qualitatively searched for.
  - NA Not analyzed
  - NP Not provided
  - IND Indeterminate. Standard and/or spikes could not be detected at method detection limit.
  - BMDL Below Method Detection Limit reported by the laboratory
- Discrepancies may exist between the laboratory data tables and the data validation summary tables due to variations in the rounding of calculations.



**DATA VALIDATION/QUALITY ASSURANCE REVIEW  
PHASE II RCRA FACILITY INVESTIGATION  
CHEM WASTE MANAGEMENT, INC. - CHICAGO INCINERATOR  
SAMPLE COLLECTION DATES: JANUARY 7 THROUGH FEBRUARY 4, 1992  
DAMES & MOORE JOB NO.: 13963-055-192**

**LABORATORY REPORT Nos.: 101503, 101505, 101507, 101508,  
101515, 101542, 101560, 101583 & 101646**

**INTRODUCTION**

Fourteen (14) vault samples, one (1) field-blank sample and two (2) trip-blank samples were collected and submitted to Environmental Testing Corporation (ETC) of Edison, New Jersey (1992 Illinois Certification No. 100224). All samples included in this review are listed on Table 1. Five (5) samples were analyzed for Appendix IX heated purge and trap volatile organic compounds (HP/T VOAs), purge and trap volatile organic compounds (P/T VOAs), herbicides and/or total cyanide. Three (3) samples were analyzed for Appendix IX semivolatile (base/neutral and acid extractable) organic compounds, pesticides and polychlorinated biphenyls (PCBs). Our samples were analyzed for Appendix IX metals while four (4) samples were analyzed for polychlorinated dibenzo-p-dioxins and polychlorinated dibenzofurans (PCDD & PCDF). All samples were analyzed following USEPA SW-846 Methodologies.

A data validation review was performed on all samples prepared under a modified CLP-SOW 3/90 CLP-I data deliverable format. Data were examined to assess the usability of the results, as well as to assess compliance relative to data package deliverable requirements. The organic data review is based upon a rigorous review of the reported hold times, surrogate recoveries, blank spike recoveries, matrix spike and matrix spike duplicate summaries, blank contaminants, internal standard area performance, Gas Chromatography/Mass Spectroscopy (GC/MS) tuning and calibration data.

The polychlorinated dibenzo-p-dioxins and dibenzofuran review is based upon a review of the reported hold times, blank spike recoveries, matrix spike and matrix spike duplicate summaries, blank contaminants, internal standard area performance, calibration data and selected ion relative intensities.

The inorganic data review is based on a review of the reported hold times, blank analysis results, blank spike recoveries, matrix spike and duplicate results, calibration results, post-digestion spike recoveries and Inductively Coupled Plasma (ICP) serial dilution analysis.

qualifiers have been placed next to the results so that the data user can quickly assess the qualitative and/or quantitative reliability of the reported result. This report was prepared to provide a critical review of the laboratory analysis and reported chemical results. Quality assurance reviews of laboratory-generated data routinely identify problems associated with analytical measurements, even from the most experienced and capable laboratories.

This review has been performed in accordance with the requirements specified in the "Laboratory Data Validation Functional Guidelines for Evaluating Organic Analyses" dated February 1988 and "Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses" dated July 1988.

**TABLE 1**  
**SAMPLES INCLUDED IN REVIEW**

<u>Sample ID</u>	<u>Lab ID</u>	<u>Date Collected</u>	<u>Test Requested</u>
<u>Log Link No. 101503</u>			
LEFB121991	HA7047	12/19/91	RCRA Appendix IX HP/T VOA, P/T VOA, BNA, Pest/PCB, Herbicides, Metals, CN, PCDD & PCDF
TB121991	HA7048	12/19/91	RCRA Appendix IX HP/T VOA & P/T VOA
L-3	HA7221	12/18/91	RCRA Appendix IX Herbicides
L-2	HA7222 & HA7225	12/18/91	RCRA Appendix IX Herbicides, PCDD & PCDF Total Cyanide
<u>Log Link No. 101505</u>			
L-1	HA7046	12/20/91	RCRA Appendix IX HP/T VOA, P/T VOA, BNA, Herbicides & Metals
<u>Log Link No. 101507</u>			
L-3	HA7223	12/30/91	RCRA Appendix IX Metals
L-1	HA7224	12/30/91	RCRA Appendix IX Pest/PCB
<u>Log Link No. 101508</u>			
L-1	HA7269	12/31/91	PCDD & PCDF & Total Cyanide
L-3	HA7270	12/31/91	PCDD & PCDF
<u>Log Link No. 101515</u>			
L-4	HA0744	01/07/92	RCRA Appendix IX HP/T VOA & P/T VOA
TB-010992	HA0749	01/09/92	RCRA Appendix IX HP/T VOA & P/T VOA
L-3	HA7226	01/13/92	Total Cyanide
<u>Sample ID</u>	<u>Lab ID</u>	<u>Date Collected</u>	<u>Test Requested</u>



Log Link No. 101542

L-4	HA7263	01/20/92	RCRA Appendix IX BNA
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Log Link No. 101560

L-4	HA7264	01/27/92 & 01/29/92	RCRA Appendix IX Pest/PCB
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Log Link No. 101583

L-4	HA7265	02/04/92 & 02/06/92	RCRA Appendix IX Herbicides, PCDD & PCDF
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Log Link No. 101646

L-4	HA7266	03/10/92	RCRA Appendix IX Metals
L-4	HA7267	03/19/92	Total Cyanide

Legend:

HP/T VOA	=	RCRA Appendix IX Heated Purge and Trap Volatile Organic Compounds
P/T VOA	=	RCRA Appendix IX Purge and Trap Volatile Organic Compounds
BNA	=	RCRA Appendix IX Semivolatile Organic Compounds
PCDD & PCDF	=	Polychlorinated Dibenzo-p-dioxins and Polychlorinated Dibenzofurans

GENERAL COMMENTS

With regard to the data package deliverables, most of the requirements were met with the exception of the metals fraction.

- This reviewer has observed that for the ICP concentrations reported at 10 to 15 times above the method detection limit (MDL), the data validation cannot reproduce the laboratory reported results. The calculation obtained during data validation is consistently higher than the laboratory reported concentration. This is due to the fact that the interelement correction factors in the ICP instrument have been externally calculated. Since this external interelement correction factor is not available for review, the reported results for low level samples cannot be reproduced. It should be noted that positive ICP reported results that are significantly above than the MDL were reproduced and validated, since this interelement correction factor becomes negligible at higher concentrations. The data review assumes that the low level reported concentrations are correct as reported and it is this reviewer's opinion that data usability is not impacted.
- In the cyanide analysis, a concentration of 0.0947 mg/L was reported on the summary page for sample L-2. However, the laboratory noted on the

- In the cyanide analysis, a concentration of 0.0947 mg/L was reported on the summary page for sample L-2. However, the laboratory noted on the cyanide raw data sheet that the analysis associated with this concentration is unreliable. The sample was re-analyzed and a concentration of 0.0844 mg/L was detected in sample L-2. This reviewer has corrected this transcriptional error on Table 2 of the report.

### DATA QUALIFIERS

The data validation review has identified aspects of the analytical data that require qualification. To confidently use any of the data within the data set, the data user should understand the limitations and qualifications presented. With regard to data usability, the following qualifiers are offered based upon the data provided.

#### ORGANIC QUALIFIERS

##### Hold Times:

- All samples were analyzed and/or extracted within the required hold time criteria for all organic parameters.

##### Blank Contamination:

- No blank contaminants which impact data usability were identified in the organic laboratory blanks and/or field blanks provided for review.

##### Surrogate Recoveries:

- The semivolatile surrogates, nitrobenzene-d5 and phenol-d5, were recovered outside the control limits (high) for sample L-4 and may be biased high. No qualifier has been applied to this sample since only one surrogate per fraction is outside the control limits. This sample, however, was qualified based on the assessment of the semivolatile internal standard performance (see Internal Standard Area Counts Section of the report).
- The pesticide/PCB surrogate, tetrachloro-m-xylene (TCX), was not recovered for sample L-1. No qualifier has been applied to compounds quantitated from this initial, undiluted analysis since the alternate surrogate, dibutylchlorodate (DBC) was recovered within control limits.
- The pesticide/PCB surrogates TCX and DBC were not recovered for both 1:100 and 1:100 dilution analyses of sample L-1, due to the high

level dilution. It is the reviewer's opinion that the impact on the data quality is minimal and no qualifier has been applied to those compounds quantitated from these dilution analyses.

- The herbicide surrogate, DICAMBA, was not recovered for samples L-1, L-2, L-3 and L-4. The non-detected herbicide results associated with samples L-1, L-2 and L-4 are regarded as unreliable and have been flagged (R) on Table 2. No qualifiers has been applied to sample L-3 since the surrogate recovery may be attributed to the high dilution required.

#### Internal Standard Area Performance:

- The area counts of the semivolatile internal standards, 1,4-nitrobenzene-d4 and naphthalene-d8 for sample L-4, were outside the control limits (low for 1,4-nitrobenzene-d4 and high for naphthalene-d8). The positive and non-detected compounds quantitated from these internal standards are regarded as estimated values and have been flagged (J/UJ) on the Table 2.
- In the PCDD/PCDF analysis, the percent recovery of the internal standard Carbon-13 labeled octachlorodibenzodioxin was outside control limits (high) for sample L-1. There is no impact on data usability since only the tetrachloro-, pentachloro-, and hexachloro- congeners were reported.

#### Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Summary:

- The HP/T blank-spike recovery of isobutyl alcohol, associated with samples L-4 and L-1 was outside the control limits (high). The positive results of this compound may be biased high and have been flagged (J) estimated on the summary tables.
- The HP/T blank-spike recovery of acrolein, associated with samples L-1, LEFB121991 and TB121991 was not recovered indicating an analytical problem may exist. This compound was aslo not deteced in the matrix spike duplicate while the matrix spike recovery for acrolein was high. Based upon these findings, the non-detected results of acrolein in these samples are regarded as unreliable and have been flagged (R) on the summary tables.
- Due to the low P/T VOA blank-spike recoveries of methyl bromide, chloroethane, dichlorodifluoromethane, methylene chloride, trans-1,3-dichloropropylene, toluene, vinyl chloride, acetone, ethylbenzene, styrene

o,p-xylene and m-xylene, associated with samples L-1, LEFB121991 and TB121991, the positive and non-detected results of these compounds have been flagged (J/UJ) estimated.

- Due to the low semivolatile blank-spike recoveries of p-chloroaniline, 3,3'-dichlorobenzidine and isophorone, associated with samples L-1 and LEFB121991, the positive and non-detected results of these compounds may be biased low and have been flagged (J/UJ) estimated.
- The semivolatile blank-spike recoveries of butyl benzyl phthalate, di-n-butyl phthalate and hexachlorbutadiene, associated with sample L-4, were outside the control limits (low). The positive and non-detected results of these compounds are regarded as estimated values and have been flagged (J/UJ) on the summary table.
- The blank-spike and matrix spike recoveries of diethyl phthalate and dimethyl phthalate, associated with samples L-1, LEFB121991 and L-4, were recovered less than 10%. The non-detected results of these compounds are regarded as unreliable and have been flagged (R) on the summary tables.
- The semivolatile matrix spike recovery of 1,2,4-trichlorobenzene for samples L-1 MS/MSD and L-4 MS/MSD was outside the control limits (high) and may be biased high. No qualifier has been applied since this compound was non-detected in the unspiked samples.
- The polychlorinated dibenzo-p-dioxin/dibenzofuran matrix spike recovery of 2,3,7,8-TCDD and total TCDD was reported as 153% by the laboratory for the quality control batch QT31650. The true MS/MSD recovery is 87% which falls within acceptable control limits.
- The pesticide blank-spike recoveries of endosulfan I, associated with the field-blank sample LEFB121991, was outside control limits (low). The non-detected results in this sample may be biased low and have been flagged (UJ) on Table 2.
- The pesticide blank-spike recoveries of endosulfan sulfate and endrin aldehyde, associated with the field-blank sample LEFB121991, was less than 10%. The non-detected results in this sample are regarded as unreliable and have been flagged (R) on the summary tables.
- The pesticide blank-spike recoveries of endosulfan II, endosulfan sulfate, endrin aldehyde, associated with sample L-1, were outside the control limits (low). The non-detected results of endosulfan II and endosulfan

sulfate in the sample may be biased low and have been flagged (UJ) estimated. The positive endrin aldehyde in the sample may also be biased low and has been flagged (J) estimated on the summary table.

- The pesticide matrix spiking compounds, aldrin, heptachlor and aldrin, associated with sample L-1MS/MSD were not recovered (0%). The positive lindane result in the unspiked sample may be biased low and has been flagged (J) estimated. The non-detected heptachlor and aldrin in the unspiked sample are regarded as unreliable (compound may or may not be present) and have been flagged (R) on Table 2.
- The pesticide matrix spiking compound, thionazin for sample L-1MS and heptachlor for sample L-4MS, were recovered outside the control limits (high). No qualifier has been applied to the unspiked samples since these compounds were reported as non-detected.

#### Initial and Continuing Calibration Results:

- Sample L-4 was analyzed for HP/T VOA at a 1:1000 dilution, due to high concentration of isobutyl alcohol in the sample. At this dilution analysis, however, the isobutyl alcohol concentration was below the method detection limit (BMDL), and the other target compounds were non-detected. Good laboratory practice calls for reanalysis when a dilution analysis produces BMDL or non-detected results. The non-detected HP/T VOA results for sample L-4 may be higher than reported and have been flagged (UJ) on the summary tables.
- Samples L-1 and L-4 were re-analyzed for semivolatile organics at higher dilutions due to target compound concentrations exceeding the linear calibration range requirements. Samples L-1 and L-5 were re-analyzed for pesticides at higher dilutions due to high target compound concentrations exceeding the linear calibration range requirements. The results of these samples are a hybrid of both initial and dilution analyses.
- Due to the high difference between the initial and continuing calibrations response factors (%D >25% and <90%), all positive results for the following volatile compounds have been flagged (J) estimated. The actual detection limit may be higher than reported and have been flagged (UJ) estimated on the summary table.

<u>Compound</u>	<u>Log Link</u>	<u>Associated Sample</u>
All HP/T VOA Compounds except for Acetonitrile	101515	TB010992

- Due to the high difference between the initial and continuing calibration response factors (%D >25 and <90%), all positive results for the following semivolatile compounds have been flagged (J) estimated. The actual detection limit may be higher than reported and have been flagged (UJ) estimated on the summary table.

<u>Compound</u>	<u>Log Link</u>	<u>Associated Sample</u>
N-Nitrosodi-n-propylamine,	101503	LEFB121991
Hexachlorocyclopentadiene,	101505	L-1
p-Nitroaniline & 3,3'-Dichlorobenzidine		

- The initial 5-point calibration for PCDD and PCDF was run on September 9, 1989. Raw data pertaining to these analyses were provided and no anomalies were noted. A daily standard which contained target compounds and internal standards was associated with each field sample analysis. The correct ions were used to calculate the relative response factors (RRF) and compound ion ratios fell within method-defined limits.
- The response factor of the volatile compound methyl ethyl ketone (MEK) in the initial/continuing calibration associated with the samples L-1, LEFB121991, TB121991, L-4 and TB010992 is less than 0.05. The non-detected results are regarded as unreliable and have been flagged (R) on the summary table.

#### Additional Comments:

- As per the requirements, all values calculated below the method detection limit should be considered estimated and have been flagged (J) on the data table.

#### INORGANIC and CONVENTIONAL PARAMETER QUALIFIERS

##### Hold Times:

- Samples L-2 and LEFB121991 were analyzed for total cyanide 6 days outside the hold time requirements. The positive cyanide result in sample L-2 may be biased low and has been flagged (J) on the summary table. The non-detected cyanide result in the field-blank sample FB121991 is regarded as unreliable and has been flagged (R) on the Table 2.

#### Blank Contamination:

- Trace presence of cyanide has been identified in the laboratory blank associated with sample L-1 at concentrations below the method detection limit (BMDL). No qualifier has been applied to the positive result of this sample since the cyanide concentration detected is above the method detection limits (MDL) and is regarded as a "real" value.
- The field-blank sample, LEFB121991, contained trace presence of lead, thallium and zinc at concentrations BMDL. Since the concentrations of these analytes in sample L-1 are greater than the MDL, the positive results are regarded as "real" and no qualifier has been applied.

#### Instrument Calibration and Verification:

- The initial and continuing calibration verification recoveries of all metals were reported within control limits.

#### ICP Serial Dilution Results:

- The ICP serial dilution analyses of nickel and tin associated with sample L-4 were outside the control limits. The positive results of these analytes for the sample have been flagged (J) estimated on the summary tables.

#### Matrix Spike (MS) and Duplicate (DU) Summary:

- Due to the low matrix spike recoveries of cadmium, chromium, nickel and antimony for sample L-4, the positive and non-detected results of these analytes may be biased low and have been flagged (J/UJ) estimated on the summary tables.
- The matrix spike recoveries of beryllium, barium, cadmium, nickel, lead, antimony, thallium and mercury for sample L-1, were outside the control limits (low). The positive and non-detected results of these analytes in the unspiked sample may be biased low and have been flagged (J/UJ) on the summary tables.
- The matrix spike recovery of arsenic in sample L-4MS was outside the control limits (high). The positive result of this analyte in the unspiked sample may be biased high and has been flagged (J) on the summary tables.
- The relative percent difference (RPD) of arsenic in the duplicate analysis of sample L-1 was outside the control limits. The positive result of this

analyte is regarded as an estimated value and has been flagged (J) on the summary table.

Post-Digestion Spike Recoveries:

- The post-digestion spike recoveries of the thallium for samples L-1, L-3 and L-4, and selenium for the field-blank sample LEFB121991, were low. The positive and non-detected results of these analytes for these samples may be biased low and have been flagged (J/UJ) estimated.

Additional Comments:

- The laboratory reports several inorganic results as below the method detection limit (BMDL). These are reported as BMDL on Table 2. The actual concentrations are not calculated during the data validation review since the interelement coefficient factors were not provided.



TABLE 2  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number		L-1	L-4	LEFB01	TB121991	920109TB
Laboratory Sample Number		HA7046	HA7044	HA7047	HA7048	HA7049
Sampling Date	Quant	12/20/91	1/07/92	12/19/91	12/19/91	1/9/92
Dilution Factor	Limit	5.0	1000	1.0	1.0	1.0
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
APPENDIX IX HEATED P/T VOLATILE COMPOUNDS						
Acetonitrile	15	93.3	UJ	U	U	U
Acrolein	20	R	UJ	R	R	UJ
Acrylonitrile	10	U	UJ	U	U	UJ
1,4-Dioxane	300	U	UJ	U	U	UJ
Ethyl cyanide	40	U	UJ	U	U	UJ
Isobutyl alcohol	230	2060 J	120000 J	U	U	UJ
Methacrylonitrile	110	U	UJ	U	U	UJ

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number		L-1	L-4	LEFB01	TB121991	TB010992
Laboratory Sample Number		HA7046	HA7044	HA7047	HA7048	HA7049
Sampling Date	Quant	12/20/91	1/07/92	12/19/91	12/19/91	1/9/92
Dilution Factor	Limit	50	250	1.0	1.0	1.0
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
APPENDIX IX P/T VOLATILE COMPOUNDS						
Benzene	4.4	2860	2990	U	U	U
Methyl bromide	4.7	UJ	U	UJ	UJ	U
Carbon disulfide	10	U	U	U	U	U
Chloroethane	6.0	UJ	U	UJ	UJ	U
Chlorobenzene	-	1440	1510	U	U	U
2-Chloro-1,3-butadiene	3.1	U	U	U	U	U
Chloroform	10	U	U	U	U	U
Methyl chloride	1.6	U	U	U	U	U
3-Chloropropene	10	U	U	U	U	U
1,2-Dibromo-3-chloropropane	2.2	U	U	U	U	U
1,2-Dibromoethane	10	U	U	U	U	U
Dibromoethane	10	U	U	U	U	U
1,4-Dichloro-2-butene	10	U	U	U	U	U
Dichlorodifluoromethane	10	UJ	U	UJ	UJ	U
1,1-Dichloroethane	4.7	U	U	U	U	U
1,2-Dichloroethane	2.8	U	U	U	U	U
1,2-Trans-dichloroethene	1.6	U	U	U	U	U
1,1-Dichloroethene	2.8	U	10900	U	U	U
Methylene Chloride	5.0	1010 J	22300	UJ	UJ	U
1,2-Dichloropropane	10	U	U	U	U	U
cis-1,3-Dichloropropene	7.2	U	U	U	U	U
trans-1,3-Dichloropropene	10	UJ	U	UJ	UJ	U
Chlorodibromomethane	10	U	U	U	U	U
Dichlorodibromomethane	10	U	U	U	U	U
Ethyl methacrylate	10	U	U	U	U	U
Iodomethane	10	U	U	U	U	U
Methyl ethyl ketone	2.8	R	R	R	R	R
Methyl methacrylate	10	U	U	U	U	U
Pentachloroethane	10	U	U	U	U	U
1,1,2,2-Tetrachloroethane	10	U	U	U	U	U
1,1,2,2-Tetrachloroethane	-	U	U	U	U	U
Tetrachloroethene	10	U	U	U	U	U
Carbon tetrachloride	4.1	U	U	U	U	U
Toluene	4.1	1580 J	17500	UJ	UJ	U

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number		L-1	L-4	LEFB01	TB121991	TB010992
Laboratory Sample Number		HA7046	HA7044	HA7047	HA7048	HA7049
Sampling Date	Quant	12/20/91	1/07/92	12/19/91	12/19/91	1/9/92
Dilution Factor	Limit	50	250	1.0	1.0	1.0
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
APPENDIX IX P/T VOLATILE COMPOUNDS (continued)						
Bromoform	6.0	U	U	U	U	U
1,1,1-Trichloroethane	1.6	U	U	U	U	U
1,1,2-Trichloroethane	3.8	U	36700	U	U	U
Trichloroethene	5.0	U	314 J	U	U	U
Trichlorofluoromethane	10	U	U	U	U	10.0 J
1,2,3-Trichloropropane	1.9	U	U	U	U	U
Vinyl Chloride	10	1780 J	8130	UJ	UJ	U
Acetone	10	UJ	U	UJ	UJ	U
Ethylbenzene	7.2	171 J	U	UJ	UJ	U
2-Hexanone	10	U	U	U	U	U
Methyl isobutyl ketone	10	U	U	U	U	U
Styrene	10	UJ	U	UJ	UJ	U
Vinyl acetate	10	U	U	U	U	U
m-Xylene	10	128 J	U	UJ	UJ	U
o,p-Xylenes	10	121 J	U	UJ	UJ	U

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number Laboratory Sample Number Sampling Date Dilution Factor Units	Quant Limit ug/L	L-1 HA7046 12/20/91 12 ug/L	L-4 HA7263 1/07/92 17 ug/L	LEFB01 HA7047 12/19/91 1.0 ug/L	TB121991 HA7048 12/19/91 NA ug/L	TB010992 HA7049 1/9/92 NA ug/L
APPENDIX IX SEMIVOLATILE COMPOUNDS						
Acetophenone	10	U	UJ	U	NA	NA
2-Acetylaminofluorene	10	U	U	U	NA	NA
4-Aminobiphenyl	10	U	U	U	NA	NA
Aniline	10	296	2000 J	U	NA	NA
Aramite	10	U	U	U	NA	NA
Benzo(a)anthracene	8.0	U	U	U	NA	NA
Benzo(b)fluoranthene	4.9	U	U	U	NA	NA
Benzo(a)pyrene	2.6	U	U	U	NA	NA
Bis(2-Chloroethoxy)methane	5.5	U	UJ	U	NA	NA
Bis(2-chloroethyl) ether	5.9	U	UJ	U	NA	NA
Bis(2-chloroisopropyl) ether	5.9	U	UJ	U	NA	NA
Bis(2-Ethylhexyl)phthalate	10	U	U	U	NA	NA
4-Bromophenylphenyl ether	2.0	U	U	U	NA	NA
Butylbenzylphthalate	10	U	UJ	U	NA	NA
2-sec-Butyl-4,6-dinitrophen	10	U	U	U	NA	NA
p-Chloroaniline	10	998 J	8500 J	UJ	NA	NA
p-Chloro-m-cresol	3.1	U	U	U	NA	NA
2-Chloranaphthalene	2.0	U	U	U	NA	NA
2-Chlorophenol	3.4	812	9260 J	U	NA	NA
Chrysene	2.6	U	U	U	NA	NA
Acenaphthene	2.0	U	U	U	NA	NA
Acenaphthylene	3.6	U	27.5 J	U	NA	NA
Anthracene	2.0	U	U	U	NA	NA
Benzo(ghi)perylene	3.2	U	U	U	NA	NA
Benzo(k)fluoranthene	2.6	U	U	U	NA	NA
Fluorene	2.0	U	U	U	NA	NA
Phenanthrene	5.6	25.4 J	22.0 J	U	NA	NA
Pyrene	2.0	U	U	U	NA	NA
2-Nitrophenol	3.7	U	UJ	U	NA	NA
o-Cresol	10	U	UJ	U	NA	NA
m+p-Cresols	10	10200	24600 J	U	NA	NA
Diallate	10	U	U	U	NA	NA
Dibenzo(a,h)anthracene	2.6	U	U	U	NA	NA
Di-n-butyl phthalate	10	U	UJ	U	NA	NA
1,2-Dichlorobenzene	2.0	U	UJ	U	NA	NA
1,3-Dichlorobenzene	2.0	U	UJ	U	NA	NA
1,4-Dichlorobenzene	4.5	U	UJ	U	NA	NA
3,3-Dichlorobenzidine	17	UJ	U	UJ	NA	NA
2,4-Dichlorophenol	2.8	6160	41200 J	U	NA	NA
2,6-Dichlorophenol	10	U	5760	U	NA	NA

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number		L-1	L-4	LEFB01	TB121991	TB010992
Laboratory Sample Number		HA7046	HA7263	HA7047	HA7048	HA7049
Sampling Date	Quant	12/20/91	1/07/92	12/19/91	12/19/91	1/9/92
Dilution Factor	Limit	12	17	1.0	NA	NA
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
APPENDIX IX SEMIVOLATILE COMPOUNDS (continued)						
Diethylphthalate	10	R	R	R	NA	NA
p-Dimethylaminoazobenzene	10	U	U	U	NA	NA
7,12-Dimethylbenzo(a)anthra	10	U	U	U	NA	NA
3,3-Dimethylbenzidine	10	U	U	U	NA	NA
a-a-Dimethylphenethylamine	-	-	-	-	NA	NA
2,4-Dimethylphenol	2.8	U	UJ	U	NA	NA
Dimethyl phthalate	10	R	R	R	NA	NA
m-Dinitrobenzene	10	U	U	U	NA	NA
4,6-Dinitro-0-cresol	25	U	U	U	NA	NA
2,4-Dinitrophenol	43	U	U	U	NA	NA
2,4-Dinitrotoluene	5.9	U	U	U	NA	NA
2,6-Dinitrotoluene	2.0	U	U	U	NA	NA
Di-n-octyl phthalate	10	U	U	U	NA	NA
Diphenylamine	10	U	U	U	NA	NA
N-nitrosodipropylamine	10	UJ	U	UJ	NA	NA
Ethyl methanesulfonate	10	U	UJ	U	NA	NA
Fluoranthene	2.3	U	U	U	NA	NA
Hexachlorobenzene	2.0	U	U	U	NA	NA
Hexachlorobutadiene	0.93	U	U	U	NA	NA
Hexachlorocyclopentadiene	10	UJ	UJ	UJ	NA	NA
Hexachloroethane	1.6	U	U	U	NA	NA
Isodrin	6.1	U	U	U	NA	NA
Hexachlorophene	10	U	U	U	NA	NA
Hexachloropropene	10	U	U	U	NA	NA
Indeno(1,2,3-c,d)pyrene	3.8	U	U	U	NA	NA
Isosafrole	10	U	U	U	NA	NA
Methapyrilene	-	IND	IND	IND	IND	IND
3-Methylcholanthrene	5.7	U	U	U	NA	NA
Methyl methanesulfonate	10	U	U	U	NA	NA
Naphthalene	1.6	U	688 J	U	NA	NA
1,4-Naphthoquinone	10	U	U	U	NA	NA
1-Naphthylamine	10	U	U	U	NA	NA
2-Naphthylamine	10	U	U	U	NA	NA
p-Nitroaniline	10	U	U	UJ	NA	NA
Nitrobenzene	2.0	U	UJ	U	NA	NA
4-Nitrophenol	2.5	U	UJ	U	NA	NA
4-Nitroquinoline-N-oxide	-	IND	IND	IND	NA	NA
N-Nitrosodiphenylamine	2.0	U	U	U	NA	NA
N-Nitrosodi-n-butylamine	10	U	UJ	U	NA	NA
N-Nitrosodiethylamine	10	U	UJ	U	NA	NA
N-Nitrosodimethylamine	10	U	UJ	U	NA	NA
N-Nitrosomethylethylamine	10	U	U	U	NA	NA

continued next page (see last page of table for notes)

TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number		L-1	L-4	LEFB01	TB121991	TB010992
Laboratory Sample Number		HA7046	HA7263	HA7047	HA7048	HA7049
Sampling Date	Quant	12/20/91	1/07/92	12/19/91	12/19/91	1/9/92
Dilution Factor	Limit	12	17	1.0	NA	NA
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
APPENDIX IX SEMIVOLATILE COMPOUNDS (continued)						
N-Nitrosomorpholine	10	U	U	U	NA	NA
N-Nitrosopiperidine	10	U	UJ	U	NA	NA
N-Nitrosopyrrolidine	10	U	U	U	NA	NA
5-Nitro-o-toluidine	10	U	U	U	NA	NA
Pentachlorobenzene	10	U	U	U	NA	NA
Pentachloronitrobenzene	10	U	U	U	NA	NA
Pentachlorophenol	3.7	U	U	U	NA	NA
Phenacetin	10	U	U	U	NA	NA
Phenol	1.5	U	131000	U	NA	NA
m-phenylenediamine	10	U	U	U	NA	NA
o-phenylenediamine	10	U	U	U	NA	NA
p-phenylenediamine	10	U	U	U	NA	NA
2-Picoline	10	U	UJ	U	NA	NA
Pronamide	10	U	U	U	NA	NA
Pyridine	10	U	2610	U	NA	NA
Safrole	10	U	U	U	NA	NA
1,2,4,5-Tetrachlorobenzene	10	U	U	U	NA	NA
2,3,4,6-Tetrachlorophenol	10	U	U	U	NA	NA
Tetraethyldithiopyrophospha	-	U	U	U	NA	NA
o-Toluidine	10	U	U	U	NA	NA
1,2,4-Trichlorobenzene	2.0	UJ	UJ	U	NA	NA
2,4,5-Trichlorophenol	10	U	U	U	NA	NA
2,4,6-Trichlorophenol	2.8	U	695	U	NA	NA
0,0,0-Triethyl phosphorothi	-	-	-	-	NA	NA
sym-Trinitrobenzene	-	IND	IND	IND	NA	NA
Benzyl alcohol	10	U	UJ	U	NA	NA
Dibenzofuran	10	U	U	U	NA	NA
Isophorone	2.3	UJ	U	UJ	NA	NA
2-Methylnaphthalene	10	41.9 J	157 J	U	NA	NA
o-Nitroaniline	10	U	U	U	NA	NA
m-Nitroaniline	10	U	U	U	NA	NA
4-Chlorophenyl phenyl ether	4.3	U	U	U	NA	NA

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TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number	L-1	L-2	L-3	L-4	LEFB01
Laboratory Sample Number	HA7269	HA7222	HA7270	HA7265	HA7047
Sampling Date	12/20/91	1/07/92	1/07/92	1/07/92	12/19/91
Units	ng/L (ppt)	ng/L (ppt)	ng/L (ppt)	ng/L (ppt)	ng/L (ppt)
PCDD/PCDF					
2,3,7,8-TCDD	13.8	12.0 U	0.78	2.1 U	0.72 U
TCDD	95.3	11.6	1.7	2.1 U	0.72 U
PCDD	0.77	1.5 U	0.75	2.1 U	0.33 U
HxCDD	4.9	0.76 U	0.51	0.95 U	0.33 U
2,3,7,8-TCDF	2.6	0.51 U	0.33	0.73 U	0.26 U
TCDF	28.0	0.51 U	1.8	0.73 U	0.26 U
PCDF	5.3	3.5 U	0.43	6.1 U	0.30 U
HxCDF	1.4 U	0.40 U	0.26 U	0.36 U	0.18 U

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TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number		L-1	L-2	L-3	L-4	LEFB01
Laboratory Sample Number		HA7224	NA	NA	HA7264	HA7047
Sampling Date	Quant	12/20/91	12/18/92	12/18/92	1/07/92	12/19/91
Dilution Factor	Limit	1.0/10/1000	1.0	1600	1.0/100/10	1.0
Units	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
APPENDIX IX PESTICIDE & HERBICIDE COMPOUNDS						
Alpha-BHC	0.05	R	NA	NA	U	U
Chlordane	1.0	U	NA	NA	U	U
Chlorobenzilate	2.5	U	NA	NA	U	U
4,4'-DDD	0.10	U	NA	NA	U	U
4,4'-DDE	0.10	U	NA	NA	U	U
4,4'-DDT	0.10	0.539 *	NA	NA	0.201	U
Dieldrin	0.10	U	NA	NA	U	U
Endosulfan I	0.05	U	NA	NA	U	U
Endosulfan II	0.10	UJ	NA	NA	U	UJ
Endosulfan Sulfate	0.10	UJ	NA	NA	U	R
Endrin	0.10	U	NA	NA	U	U
Endrin Aldehyde	0.10	0.365 J*	NA	NA	U	R
Hepatchlor	0.05	R	NA	NA	U	U
Hepatchlor Epoxide	0.05	U	NA	NA	U	U
Beta-BHC	0.05	U	NA	NA	U	U
Delta-BHC	0.05	U	NA	NA	U	U
Gamma-BHC (Lindane)	0.05	7.17 J*	NA	NA	0.439	U
Kepone	0.55	1.38 *	NA	NA	U	U
Methoxychlor	0.55	U	NA	NA	U	U
Toxaphene	2.0	U	NA	NA	U	U
Arochlor-1016	0.50	U	NA	NA	U	U
Arochlor-1221	0.50	U	NA	NA	U	U
Arochlor-1232	0.50	U	NA	NA	U	U
Arochlor-1242	0.50	U	NA	NA	U	U
Arochlor-1248	0.50	U	NA	NA	U	U
Arochlor-1254	1.0	U	NA	NA	U	U
Arochlor-1260	1.0	U	NA	NA	U	U
Thionazin	1.0	U	NA	NA	U	U
Dimethoate	2.5	U	NA	NA	U	U
Disulfoton	0.55	U	NA	NA	2.89	U
Methyl parathion	1.0	U	NA	NA	U	U
Parathion	1.0	U	NA	NA	U	U
Phorate	2.5	U	NA	NA	204 *	U
Famphur	10	U	NA	NA	U	U
HERBICIDES (Laboratory ID)		HA7046	HA7222	HA7221	HA7265	HA7047
2,4-D	3.8	R	R	U	R	U
2,4,5-T	0.76	R	R	U	R	U
2,4,5-TP (Silvex)	0.76	R	R	U	R	U

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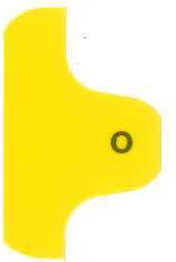
TABLE 2 (continued)  
SUMMARY OF ANALYTICAL RESULTS  
PHASE II INVESTIGATION  
CHEMICAL WASTE MANAGEMENT  
CHICAGO, ILLINOIS

Dames and Moore Sample Number Laboratory Sample Number Sampling Date Units	Quant Limit ug/L	L-1 HA7046 12/20/91 ug/L	L-2 NA 12/18/92 ug/L	L-3 HA7223 1/07/92 ug/L	L-4 HA7266 1/07/92 ug/L	LEFB01 HA7047 12/19/91 ug/L
APPENDIX IX INORGANIC (METALS) PARAMETERS						
Antimony	60	150 J	NA	U	UJ	U
Arsenic	10	110 J	NA	220	180 J	U
Barium	20	2000 J	NA	520	1100	U
Beryllium	1.0	9.1 J	NA	2.5	15	U
Cadmium	2.0	60 J	NA	4.8	42 J	U
Chromium	10	4270	NA	200	2900 J	U
Cobalt	20	240	NA	89	130	U
Copper	10	3180	NA	310	1280	U
Lead	5.0	8190 J	NA	260	2200	BMDL J
Mercury	0.20	2.5 J	NA	0.40	1.20	U
Nickel	20	1100 J	NA	2160	1200 J	U
Selenium	5.0	BMDL J	NA	300	140	UJ
Silver	10	BMDL J	NA	U	BMDL J	U
Thallium	10	UJ	NA	UJ	BMDL J	U
Tin	50	U	NA	U	1300 J	BMDL J
Vanadium	20	190	NA	370	260	U
Zinc	20	38300	NA	2800	10700	BMDL J
Laboratory Sample Number Units	mg/L	HA7269 mg/L	HA7225 mg/L	HA7226 mg/L	HA7267 mg/L	HA7047 mg/L
Cyanide, total	0.010	0.0644	0.0844 J	0.127	33.6	R

LEGEND:

- U Compound was not detected at laboratory method detection limit.
- J Estimated value due to limitations identified during the quality assurance review.
- UJ Reported method detection limit is estimated due to limitations identified during the quality assurance review.
- B Compound was detected in a laboratory and/or field blank at similar concentrations. May represent laboratory and/or field contamination.
- R Unreliable result. Compound may or may not be present.
- \* Sample analyzed at multiple dilutions. Summary table is a hybrid of diluted and undiluted results.
- No standard available. Compound was qualitatively searched for.
- NA Not analyzed
- NP Not provided
- IND Indeterminate. Standard and/or spikes could not be detected at method detection limit.
- BMDL Below Method Detection Limit reported by laboratory.

Discrepancies may exist between the laboratory data tables and the data validation summary tables due to variations in the rounding of calculations.



**RFI BASELINE HUMAN HEALTH RISK ASSESSMENT  
CWMCS CHICAGO INCINERATOR FACILITY  
CHICAGO, ILLINOIS**

**FEBRUARY, 1995**

**Dames & Moore No. 13963-055**

**CHEMICAL WASTE MANAGEMENT SERVICES, INC. (CWMCS)**  
**CHICAGO INCINERATOR FACILITY**  
**FINAL RCRA FACILITY INVESTIGATION REPORT**  
**RFI BASELINE HUMAN HEALTH RISKS ASSESSMENT, APPENDIX O**  
**ERRATA**

The following changes and corrections have been made to the Human Health Risk Assessment dated January 10, 1994 in response to USEPA comments listed in Attachment II of the June 3, 1994, submittal. These changes also appear in bold type in the revised document.

Section 1.1, para 3: Specific Comment 2 and General Comment 4. The following sentence was added. "The fill material was not waste and was not stabilized waste materials, which was imported from off-site sources."

Section 2.0, para 2: The following text was added in response to Specific Comment 6. "These results became invalid during the data validation procedure due to the inability of the method to quantify, with adequate quality assurance, the reported number. Therefore, results reported as BMDLs were not used in the Risk Assessment. Numerical values for these samples were treated as non-detect values."

Section 2.0, para 5: The following text was added in response to General Comment 7. "Phase I clay data were not used due to problems encountered during collection of these samples that rendered them invalid. Phase II clay sampling locations are shown in Fig 1-2, Part 1, Section 1 of the Final RCRA RFI."

Section 2.0, para 6: The following text was added in response to Specific Comments 8 and 10. "Surface soil samples SS-11, SS-12, and SS-13 were originally identified as baseline samples, since they were taken from an undeveloped pier north (upgradient) of the facility boundary. The CWMCS facility and adjacent piers are constructed upon imported fill material consisting of construction rubble and other unclassified materials from unknown sources. Surficial soils taken from any of the man-made piers near the facility are not naturally occurring and may have originated from different sources over a long period of time. After evaluating chemical constituent levels in these samples and considering that the adjacent pier is made of man-made fill materials, it was determined that fill material, regardless of sample location, is not representative of local baseline conditions. During RFI investigations, it was determined that the Lake Calumet sediment depth is approximately 6 inches. Immediately beneath this sediment layer is the upper lacustrine unit, which is a natural deposit. For

these reasons, the naturally-occurring "clay" layer was considered more representative of baseline conditions than samples taken from the imported fill material on an adjacent pier. For reference, analytical data for surface soil samples S-11, S-12, and S-13 are included in Appendix K."

Section 2.1, para 1: The reference 40 CFR, Part 246 was added. Specific Comment 9.

Section 2.1, para 2: The sentence "A summary of metals levels in surface soil samples collected facility-wide is included in Appendix A." was added in response to Specific Comment 5.

Section 2.1, para 2: The sentence "Hence, no metals were eliminated due to a low frequency of detection" was added in response to Specific Comment 7.

Section 2.1, para 3: The sentence "A summary of metals levels in surface soil samples collected facility-wide is included in Appendix A." was added in response to Specific Comment 5.

Section 2.1, para 3: The sentence "Hence, no metals were eliminated due to a low frequency of detection" was added in response to Specific Comment 7.

Section 2.1, para 3: The following text was added in response to Specific Comment 11. "Given that the area surrounding the CWMCS facility has historically been a heavily industrialized area, anthropogenic contamination of a variety organic chemicals is expected, especially given the heterogenous fill material used to create land surface around Lake Calumet. Numerous past and current sources of TCE other than the CWMCS facility are likely. In this case, use of statistical comparison to eliminate compounds not detected in facility samples at levels significantly higher than baseline levels is appropriate. Furthermore, the addition of TCE as a COPC would not alter risk estimates, since EPA has withdrawn all toxicity values for TCE from IRIS. Hence, risks associated with exposure to TCE cannot be evaluated quantitatively."

Section 2, Table 2-3: Critical (table) t values and additional information on the K-S test were added in response to General Comment 5 and Specific Comment 12.

Section 3, para 1: "and routes" was added to bullet 3 in response to Specific Comment 12.

Section 3.1.3, para 1-2: The following text was rewritten and expanded to respond to General Comment 2 and Specific Comments 4 and 14. "Fishermen have been observed fishing in Lake Calumet near the CWMCS facility. These individuals may come into contact with contaminated sediments while standing at the edge of or wading into Lake Calumet. These receptors may also be exposed to contaminated surface water. This potential exposure pathway was not quantified, however, since very little contamination was detected in surface water near the CWMCS facility (CWMCS, 1993).

Although ingestion of fish taken from areas of Lake Calumet adjacent to the CWMCS facility is possible, this pathway is highly uncertain and difficult to quantify for several reasons. Potential exposures associated with ingestion fish taken from Lake Calumet were not evaluated for the following reasons.

1. Fish tissue samples were not collected as part of the RFI, because it would be impossible to confidently attribute any chemical contamination measured in fish to any one source. In addition to more than a century of industrial activity along Lake

Calumet, this lake is currently impacted by a variety of non-point sources, including highway runoff, surface runoff from industrial properties, and seepage of contaminated groundwater from nearby landfills, dumps, waste lagoons, and underground storage tanks (IDENR, 1988). Nor is it realistic to measure chemical levels in fish taken from waters adjacent to any facility located near Lake Calumet and assume that potential impacts are due only to releases from that facility. Thus, while the occasional recreational fisherman is expected to represent the population most likely to be exposed to potential contaminants in surface water and sediment, subsequent human exposures from the ingestion of fish contaminated due to release from a single source cannot be readily and unequivocally evaluated in this assessment.

2. Very little contamination was detected in surface water (See Section \_\_\_ of the RFI). Given that a) uptake of contaminants across the gill membrane from water is the primary route by which fish are exposed to and accumulate contaminants and b) very little contamination was detected in surface water near the CWMCS facility, fish tissue levels resulting from exposure to contaminated surface water near the CWMCS facility are expected to be low.
3. Although the sediments near the facility do contain detectable levels of facility-related COPCs, USEPA agreed that "to model the transfer of contamination from sediments to aquatic life would involve significant uncertainties."

Section 3.3, para 4: The following text was added in response to General Comment 5. "The nonparametric Kolmogorov-Smirnov (KS) goodness-of-fit test with Lilliefors correction is an effective method for testing whether a data set has been drawn from an underlying normal distribution or a lognormal distribution if the data has been log transformed. The K-S test was selected because it is more robust than the Chi Square Goodness of Fit test. The sample distribution is curve fit against the true distribution and the maximum difference between the two distributions is used to calculate the goodness of fit. The Lilliefors correction is used to calculate the parameters needed to calculate the true mean and standard deviation of the data set. The significance level indicates that, at the 95% level of confidence, the data set is statistically similar to a normal or a lognormal distribution (i.e., the data set is normally or lognormally distributed), or the data set is statistically different from a normal or a lognormal distribution (i.e., the data set does not fit one of the two distributions). A significance level (Column 4 of Table 3-2) greater than 0.05 indicates that the data set fits the distribution specified in Column 3. Conversely, if the significance level is less than 0.05, no relationship can be drawn from the data set."

Section 3.3.1, para 1-2: Specific Comment 17. This section was rewritten to account for the fact that surface soil samples SS-1, SS-2, SS-3, SS-4, SS-5, SS-14, SS-15, SS-16, SS-17, SS-20, and SS-21 (n = 11) were used to model exposures by current workers, while all 20 surface soil samples collected were used to model exposures by future workers. Information on sample size, detection frequency, range, mean, standard deviation, UCL concentrations, maximum measured value, and the exposure-point concentration derived for each COPC used to model intakes by current and future workers is summarized in the revised Tables 3-3 and 3-4, respectively.

Section 3.3.2, para 2: Specific Comment 19. This paragraph was expanded to justify why particulate emissions from vehicular traffic were not modeled. The transport of contaminants from surface soil

to the atmosphere is primarily a function of wind erosion and mechanical disturbances. Particulate emissions were expected to result primarily from wind erosion for the following reasons. One, current levels of vehicular traffic were assumed to be negligible relative to impacts from wind erosion. Since vehicular traffic is almost exclusively limited to paved areas of the facility, this source contributes minimally to airborne particulate emissions. Two, CWMCS maintains a Fugitive Particulate Operating Program (FPOP) at the facility in accordance with environmental regulations promulgated by the State of Illinois. The implementation of procedures specified in the FPOP continues to be effective in controlling fugitive emissions that may result from vehicular traffic or construction activities. Three, for any major construction activities that may occur at the facility, requirements to control fugitive emissions are specific included in the project plan to ensure that unacceptable levels of these emissions do not occur. For these reasons, the concentration of facility-related COPCs in fugitive dust was based on wind erosion."

Section 3.3.2, para 3: DH was defined as 2 m. Specific Comment 20.

Section 3.3.2, para 4: Specific Comment 20. The following paragraph was added to clarify why meteorological data from Midway airport was not used. "Meteorological data collected from the Midway Airport were not used, as initially intended, for the following reasons. When the National Climatic Data Center was contacted, it indicated that the data is routinely collected on paper with one day of meteorological measurements written per page. Therefore, the data would have to be entered into a compatible computer format, and the modeler would have to determine the appropriate mixing height and stability classes for the data set. Since this task would be very time consuming, EPA default meteorological data were used. Use of these default data are expected to yield higher air concentration estimates than those predicted using the Midway Airport data."

Section 3.4, para 2: The following text was added in response to General Comment 6. "It was assumed for this assessment that current and future on-site workers would follow OSHA rules and regulations (29 CFR, Part 1926) while performing work-related duties. OSHA regulations required the use personal protective equipment (PPE) to limit or prevent exposure to hazardous constituents. While ownership and work practices may change in a future industrial use scenario, OSHA regulations play a substantial role in protecting workers, both current and future. OSHA requires employers to perform a hazard assessment of possible workplace hazards. If a potential hazard may be present, the employer must select and ensure that employees use appropriate PPE. While CWMCS acknowledges that the use of PPE is not foolproof, any exposure to contamination that may occur in these situations would be of short duration. Hence, the parameters and assumptions used to model exposures by current and future workers reflect the judgment that OSHA regulations are followed."

Section 3.4.1.1, para 1: Specific Comment 21. The following text was added to clarify why a soil ingestion rate of 50 mg/day was used for workers. "Although USEPA (1991a) states that "For certain outdoor activities in the commercial/industrial setting (e.g., construction or landscaping), a soil ingestion rate of 480 mg per day may be used" the 50 mg/day ingestion rate was deemed a more appropriate value for all workers given the health and safety precautions required for construction activities. Furthermore, the 50 mg/day value has an empirical basis (Calabrese et al., 1990), while the 480 mg/day value does not."

Section 3.4.1.1, para 1: Specific Comment 26. The following text was added to clarify the definition of FI values used to model worker exposures. "The FI represents the length of time individuals

spend on-site. Since a time-weighted FI value of 1.0 indicates that individuals work the default eight-hour day, the 1.5 value indicates that remediation workers were on-site more than the standard eight-hour workday. Similarly, FI values less than 1 indicate that workers are on-site less than the standard eight-hour workday." All corresponding tables were also modified.

Section 3.4.1.2, para 1: Specific Comment 23. The following text was added to clarify how fugitive dust concentrations were used to model dermal exposures. "The concentration of COPCs in fugitive dust in  $\text{mg}/\text{m}^3$  was converted to units of  $\text{mg}/\text{kg}$  using the following conversion factors:  $\{[(\text{m}^3/1000 \text{ L}) (\text{L}/1.29 \text{ g}) (1000 \text{ g}/\text{kg})]\}$  where  $1.29 \text{ g}/\text{L}$  is the density of air. These conversion factors are included in Equation 3-6 as CF1. Converting the concentration of COPCs in fugitive dust to  $\text{mg}/\text{kg}$  is equivalent to modeling dermal exposure to COPCs in soil. COPCs in fugitive dust could land on exposed skin surfaces and be absorbed through the skin."

Section 3.4.1.1, para 2: The text was changed to reflect that fugitive dust concentrations were based on soil sample data collected facility wide ( $n = 20$ ) in response to Specific Comment 21.

Section 3.4.1.2, para last: The following was added in response to Specific Comment 27. "An ABS value of 0.5 was used for 1,1-dichloroethylene and methylene chloride, and an ABS value of 0.05 was used for all other organic COPCs."

Section 3.4.2: Specific Comment 25. This section was changed to note that an inhalation rate of  $20 \text{ m}^3$  per workday ( $2.5 \text{ m}^3/\text{hr}$ ) was used for all receptors. All corresponding tables were also modified.

Section 3, Table 3-2: Information on the maximum measured value was added. Specific Comment 15.

Table 4-1: Equation used to derive inhalation CSFs from unit risk values was added (Specific Comment 28). Reference for RfCs for methylene chloride changed to HEAST (Specific Comment 29).

Section 5: The entire section and corresponding tables has been rewritten to reflect changes in different exposure-point concentrations used for current and future workers and other changes noted above. Specific Comments 30 through 39.

Section 6: Section 6 has not been altered.

Section 7: References were put into chronological by author in response to General Comment 8.

Tables: All tables were modified as necessary in response to General Comment 9.

Appendix A: Tables showing data points that were ND or BMDL values are included (Specific Comment 40).



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## **1.0 INTRODUCTION**

CWM Chemical Services, Inc. (CWMCS) is performing a Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) at their Chicago Incinerator facility. The RCRA Corrective Action Plan for the facility was developed as part of a Consent Judgment between CWMCS and the USEPA in response to a RCRA Facility Assessment (RFA) performed by the Illinois Environmental Protection Agency (IEPA). The RFI will assess the distribution of potentially hazardous constituents released from solid waste management units (SWMUs) into air, soils, groundwater, and surface water at or near the facility. The Baseline Risk Assessment (Baseline RA) portion of the RFI will quantify the potential level of risk, if any, to potential human and ecological receptors. The primary objective of the Baseline RA is to determine if historical releases from these SWMUs pose a threat to human health or the environment. This Baseline RA includes both a human health risk assessment (HHRA) and an ecological risk assessment (ERA). The HHRA focuses on risks to individuals who could be exposed to facility-related contaminants released from these SWMUs, including on-site workers, off-site residential and recreational receptors, and trespassers. The ERA focuses on risks to ecological receptors, including aquatic organisms inhabiting Lake Calumet and terrestrial species that may frequent the facility. This report presents the methodologies, criteria, and data used to evaluate potential human health effects. Potential ecological effects are evaluated in a separate document.

### **1.1 Facility Background**

Until the late 1920's, Lake Calumet extended beyond its current borders. Construction of the Cal-Sag Canal and the associated flood control units allowed some drainage. Many of these reclaimed lands were filled with construction debris, wood, slag, and soil. Most of the area occupied by the present day facility remained under water until the early 1960's when a railroad was constructed along the eastern shore of Lake Calumet. The area of the facility containing the current incinerator complex was subsequently constructed using fill, followed by the construction of the pier in the early 1970's.

In 1971, Hyon Waste Management, Inc. (Hyon) constructed an incinerator, office building, and a control building on the property. Hyon operated the waste treatment facility until 1979 when the equipment and permits were purchased by SCA Chemical Services, Inc. (SCA). The Hyon operation was to include the incineration of liquid and hazardous wastes and the neutralization and biological treatment of aqueous hazardous waste. About 10% of this waste was incinerated, while the remainder was treated. From 1972 to 1976, about 68 million gallons of chemical wastes were treated at the plant. Nine former solid waste management units (SWMUs) have been identified by USEPA: two wastewater basins, the high solids basin, the biobeds, the biochemical treatment area, the chemical treatment area, the concrete activated sludge basins, the underground pipe network, and the drum handling area. A tenth SWMU, the Hyon Tank Farm, was identified during the Work Plan preparation for this RFI (Fig. 1-1).

The facility permit was transferred to SCA Chemical Services, Inc. in November, 1980. In 1981 under the direction of IEPA, SCA constructed a clay-lined vault on the western portion of the pier. Excavation and solidification of waste materials present in other SWMUs was accomplished and placed in the vault. Excavated basins were backfilled and covered with innocuous fill. **The fill material was not waste and was not stabilized waste materials, which was imported from off-site sources.** Subsequently, portions of the underground pipe network were abandoned (plugged with concrete) in place.

## 1.2 Current Facility Description

The CWMCS Chicago Incinerator facility is located on approximately 30 acres of land built on fill on the eastern shore of Lake Calumet within the City of Chicago, Cook County, Illinois. Fig. 1-2 shows the general location of the facility. The incinerator complex occupies the southeast portion of the facility. Directly north of this complex is the employee parking lot and a vacant area. The pier, which extends approximately 2,300 feet southwest from the vacant area into Lake Calumet, comprises the remainder of the facility. The area surrounding the facility is zoned heavy industrial and is used almost exclusively for waste management operations. Directly to the east, across the street from this facility, is the Paxton II Landfill. The Paxton

II Landfill was a solid and non-hazardous special waste landfill that used a trench system for waste burial. The facility stopped receiving wastes in early 1992 pursuant to legal action by the State of Illinois. To the southeast, across the street from the CWMCS facility and immediately south of the Paxton II Landfill, is the operating Land & Lakes Landfill. Immediately to the east of the Land & Lakes Landfill is the Paxton Avenue Lagoons site, which is undergoing remediation by the State of Illinois. Adjacent to the CWMCS facility on the south side is the Clean Harbors of Chicago Inc. facility, which uses chemical processes to remove heavy metals and suspended solids from aqueous and organic waste streams.

CWMCS acquired the operations in 1985 and carried out a detailed surface water, sediment, soil, and subsurface investigation of the facility to further characterize potential releases of contaminants from the former SWMUs as part of this RFI. Details on past and current site conditions are available in the RCRA Facility Investigation Report (CWMCS, 1993). The facility is located in the Chicago Lake Plain Region. The facility is not located within a 100-year floodplain, and no natural streams or wetland areas occur on-site (CWMCS, 1993).

### **1.3 Overview of the Human Health Risk Assessment Approach**

RCRA risk assessments evaluate potential impacts associated with the generation, storage, treatment, or disposal of hazardous or solid wastes within the facility boundary and adjacent areas "where necessary to protect human health and the environment" (USEPA, 1989a). Thus, RCRA exposure scenarios are typically predicated on the assumption that exposure will occur at or within the boundaries of a waste management unit. While a substantial portion of the hazardous wastes have been removed from several of the former SWMUs on-site, it is not known whether sufficient quantities of residual materials are present in locations that may pose a risk to human health or the environment. As a result, this risk assessment utilizes a CERCLA-type approach for the following reasons: (1) USEPA Region V has specified that the technical approach for this RFI should be a "facility-wide" approach; (2) USEPA Region V specified that CERCLA risk assessment guidance, OSWER Directive #9285-6.03, be used (Letter from Mr. Joseph M. Boyle to Mr. Kevin K. Hersey, dated May 15, 1992); and (3) the RCRA

framework has no guidance for worker exposures, and workers (both current and future) are likely to be most exposed. The HHRA is designed to estimate both the current and future impacts associated with human exposure to facility-related contaminants present in existing SWMUs. The HHRA will evaluate potential risks to both on-site and off-site receptors using actual monitoring data, where possible, or modeled concentrations when measured data are not available.

Risk assessment provides a mechanism for estimating risks and for providing a baseline for both current and potential future exposures. Risk assessment is a process that synthesizes available data on exposure and toxicity of chemicals and uses scientific judgment to estimate the potential risk to human health and the environment. Risk assessment, or the characterization of potential adverse human health effects resulting from exposure to environmental contaminants, involves four consecutive steps:

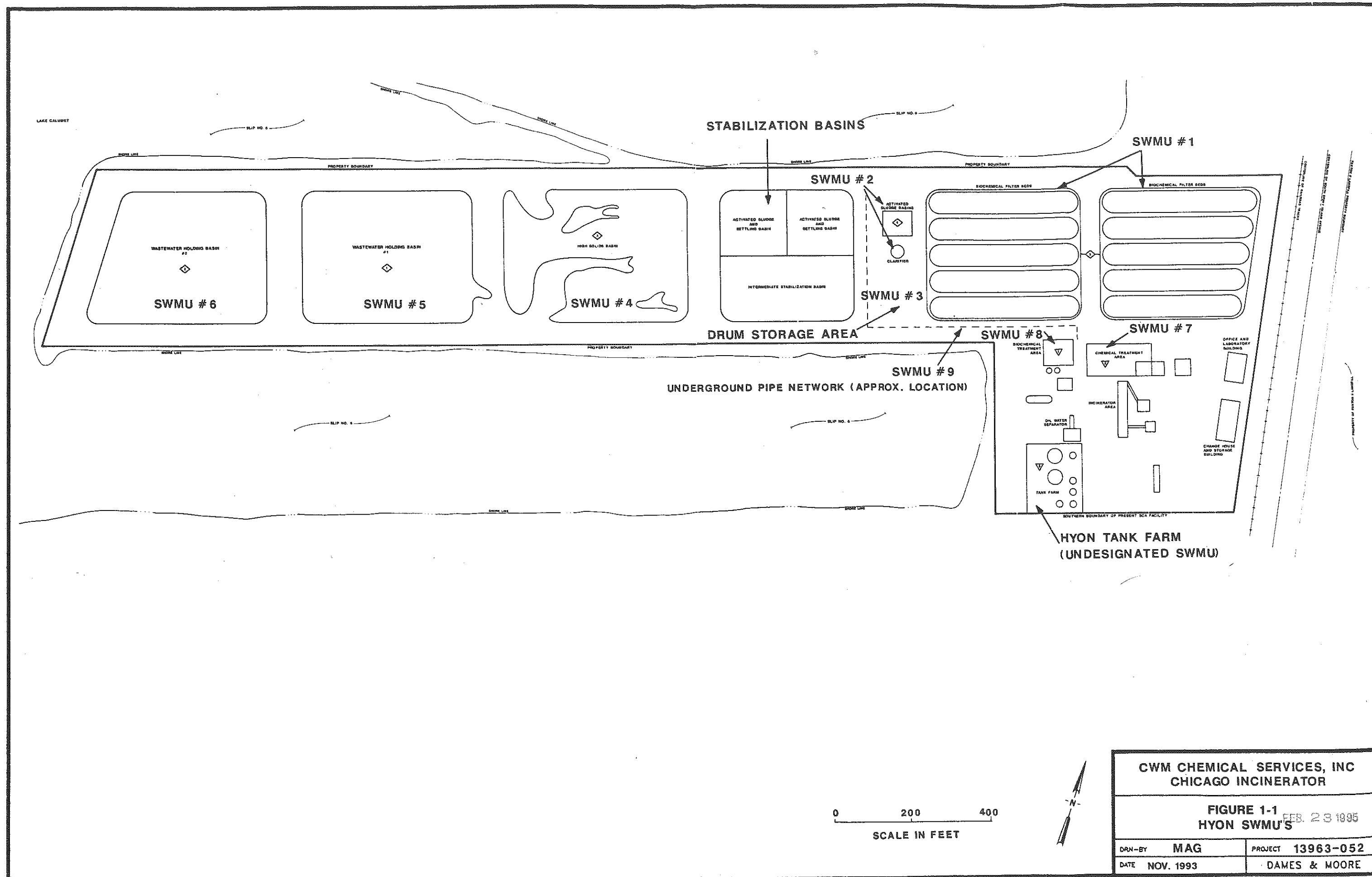
- **Data Collection and Evaluation:** identifying contaminants and defining the nature and magnitude of potential facility-related chemical releases;
- **Exposure Assessment:** determining the current and potential future extent of human exposure to these facility-related environmental contaminants;
- **Toxicity Assessment:** determining the relationship between the magnitude of exposure and the type and likelihood of adverse health effects, and
- **Risk Characterization:** combining the first three steps to yield quantitative and qualitative estimates of health risk.

This sequence is applicable whether the health risk under evaluation is cancer or a non-cancer endpoint.

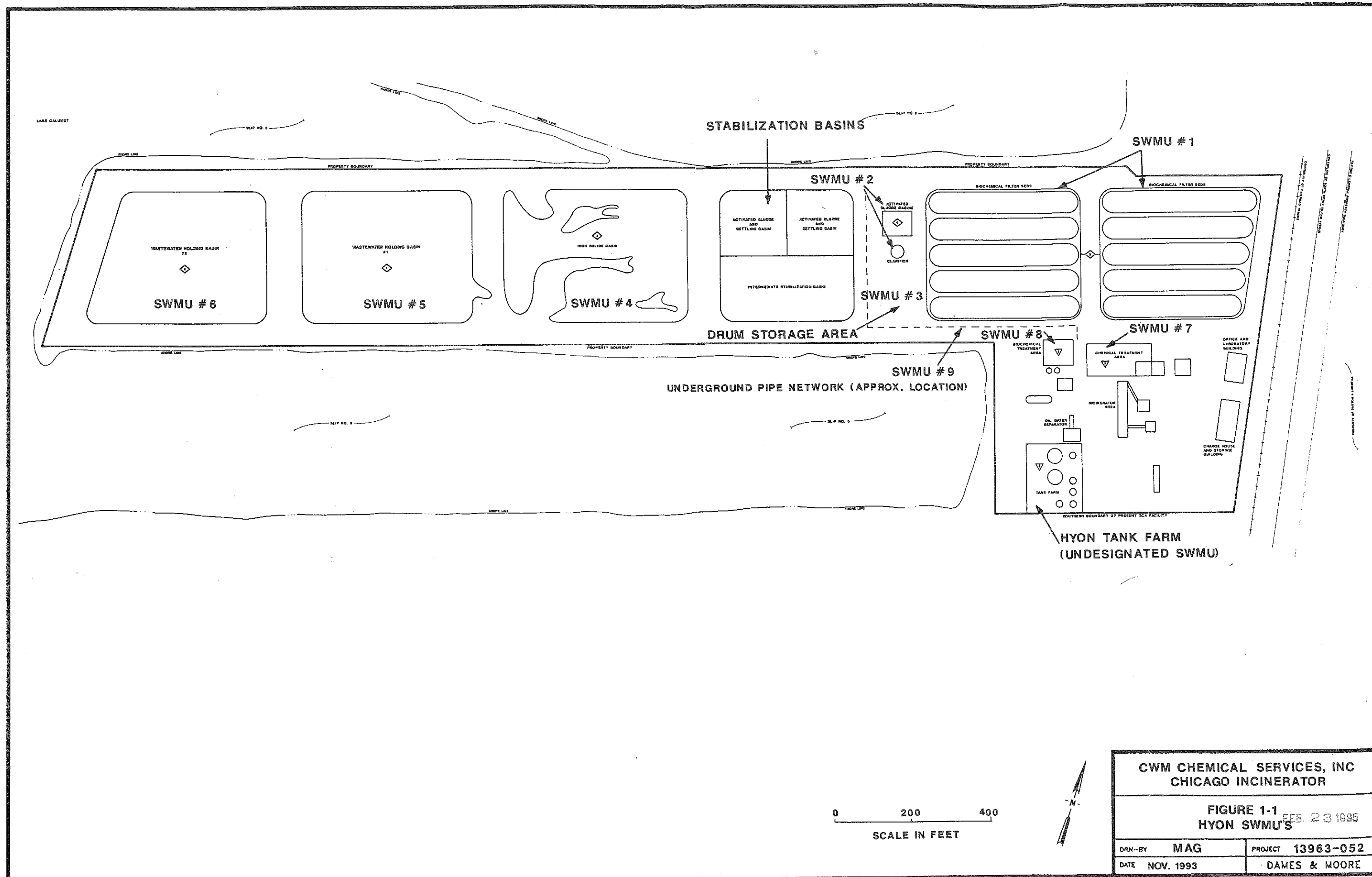
The first step in the HHRA is to identify chemicals of potential concern (COPCs). The methodology used to establish COPCs is described in Section 2.0 of this report. This step is followed by an evaluation of potential exposure pathways and the quantification of chronic daily intakes. The identification of exposure routes (such as inhalation and ingestion), and receptor



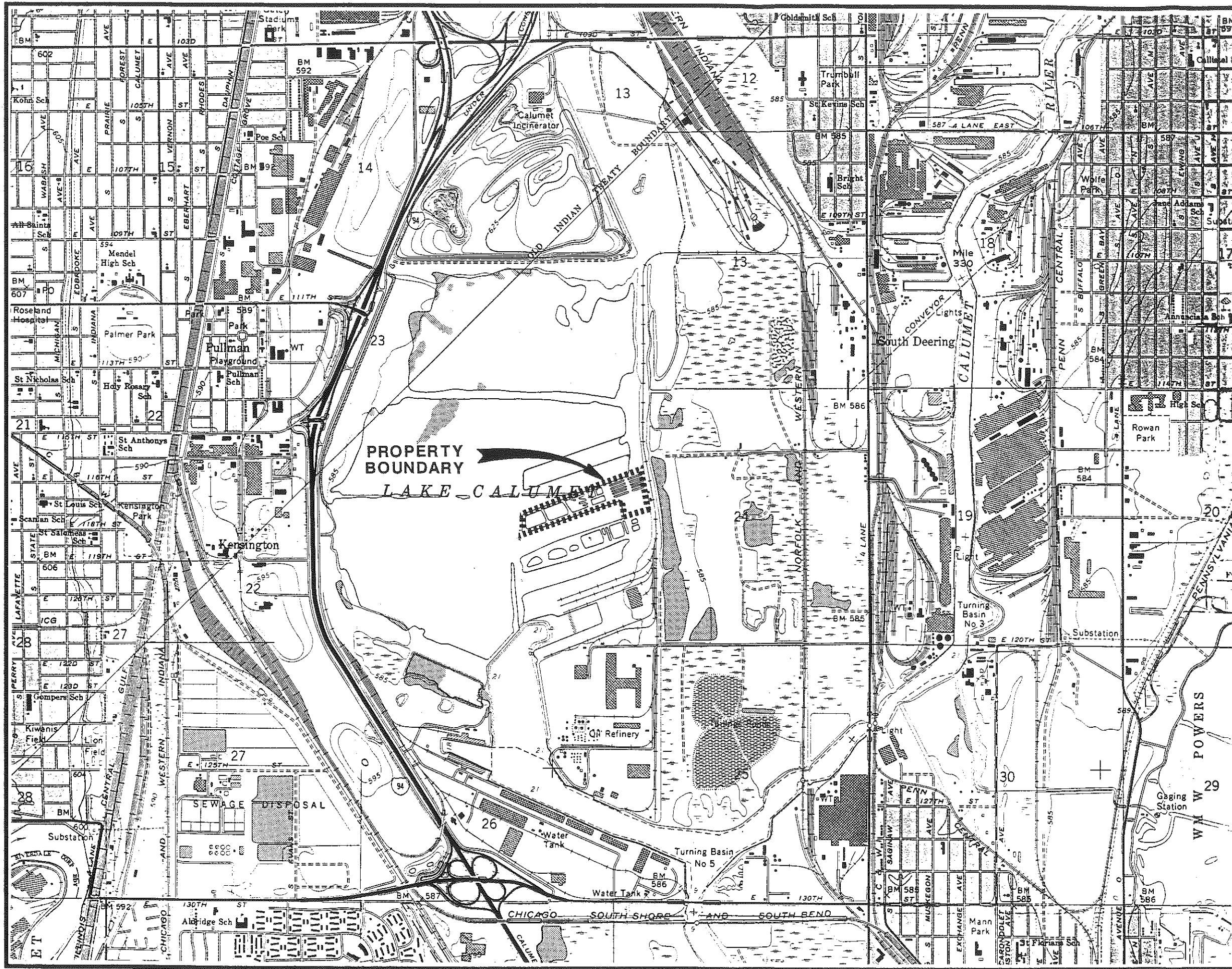
locations is crucial to determine the validity of a potential exposure pathway. After likely current or future complete exposure pathways are identified, exposure point concentrations and receptor intakes are calculated. The next step, toxicity assessment, identifies previously selected COPCs that may result in adverse health effects in exposed populations. However, the number of compounds that can be quantitatively evaluated in the HHRA is limited by the availability of chemical-specific dose-response data. The final step, risk characterization, integrates information from the exposure and toxicity assessments to yield quantitative estimates of risk. Chemicals or pathways with incomplete toxicological data bases are discussed qualitatively. An analysis of uncertainty is conducted for the assessment. This summary of potential areas of both under and overestimates of risk is often considered a fifth component of the risk assessment process. To accomplish these tasks, a systematic evaluation of the potential risks to human health was done in accordance with the following USEPA guidance documents and guidelines: *Risk Assessment Guidance for Superfund. Volume I, Human Health Evaluation Manual (Part A)* (USEPA, 1989a), the Office of Solid Waste and Emergency Response (OSWER) Directive 9285.6-03, *Supplemental Guidance: Standard Default Exposure Factors* (USEPA, 1991a); *Exposure Factors Handbook* (USEPA, 1990a), *Guidance for Data Useability in Risk Assessment* (USEPA, 1990b); *Guidelines for Exposure Assessment* (USEPA, 1992a); *Dermal Exposure Assessment: Principles and Applications. Interim Report* (USEPA, 1992b), and *Guidance on Risk Characterization for Risk Managers and Risk Assessors* (USEPA, 1992c).



CWM CHEMICAL SERVICES, INC CHICAGO INCINERATOR	
FIGURE 1-1 HYON SWMU'S	
DATE NOV. 1993	PROJECT 13963-052
DRAWN BY MAG	DAMES & MOORE



CWM CHEMICAL SERVICES, INC CHICAGO INCINERATOR	
FIGURE 1-1 HYON SWMU'S	
DATE NOV. 1993	PROJECT 13963-052
DATE NOV. 1993	DAMES & MOORE



BASE MAP SOURCE:  
USGS 7.5 MINUTE TOPOGRAPHIC  
QUADRANGLE, LAKE CALUMET,  
ILLINOIS-INDIANA, DATED 1965,  
PHOTOREVISED 1973,  
PHOTOINSPECTED 1977.

SCALE: 1"=2000'

CWM CHEMICAL SERVICES, INC.  
CHICAGO INCINERATOR

FIGURE 1-2 FEB. 23 1995  
REGIONAL LOCATION MAP

DRN-BY SLH	PROJECT 13963-055
DATE NOV. 1993	DAMES & MOORE

## 2.0 IDENTIFYING CHEMICALS OF POTENTIAL CONCERN

After collecting and analyzing environmental samples from the facility area, the first step in the human health risk assessment process is to identify chemicals of potential concern (COPCs). COPCs are chemicals that were detected in media samples collected from the area of the CWMCS facility that may pose adverse impacts to humans. A phased screening process was used to identify COPCs in surface soils and air. It was not necessary to determine COPCs for groundwater in the fill material, since on-site workers do not use the local groundwater for drinking or washing. In accordance with 35 Illinois Administrative Code, Part 620, IEPA has concurred that groundwater occurring within the fill at this CWMCS facility is a Class II, General Resource Groundwater, and is a non-potable groundwater resource (IEPA, 1993). Similarly, it was not necessary to derive COPCs for surface water and sediment, since Lake Calumet is not used for recreational swimming as further described in Section 3.1.3 of this report. Chemicals of potential concern in surface water and sediment are evaluated in the ecological risk assessment prepared for this facility.

**All available validated analytical data were used.** The selection of COPCs was based on the following data. The data validation packages (Appendix N) have primacy in the review, which is consistent with guidance received from U.S. EPA Region V. ETC Analytical Data Packages upon which the data validation was conducted were used to derive numerical values for data points listed as "BMDL" (Below Method Detection Limit) or "ND" (Not Detected) in the data validation packages. The ETC Analytical Data Packages did not list numeric values for positive readings ("hits") that were below the method detection limit (MDL) [ETC's MDL is the sample quantitation limit (SQL)]. Analytical results reported as BMDL were not validated. **These results became invalid during the data validation procedure due to the inability of the method to quantify, with adequate quality assurance, the reported number. Therefore, results reported as BMDLs were not used in the Risk Assessment.** Numerical values for these samples were treated as non-detect values. Hence, points listed as a BMDL were assumed to be equal to one-half the SQL. Similarly, numeric values reported as non-detected in the data validation process were also assumed to be equal to one-half the SQL.

Selection of COPCs in surface soil involved a three phase process. In the first phase, the concentrations of chemicals detected in blanks were compared with their concentrations detected in facility samples. In accordance with USEPA risk assessment guidance, sample results were considered positive only if the concentration in the facility sample was five times the maximum concentration detected in any blank sample [10 times for the common laboratory artifacts: acetone, methyl ethyl ketone, methylene chloride, toluene, and phthalate esters (USEPA, 1989a)]. The second phase included an evaluation of detection frequencies. Compounds with detection frequencies of five percent or less in facility-related samples from any medium were eliminated from further consideration in that medium (USEPA, 1989a).

The third phase involved comparing measured concentrations in various environmental media (e.g., soil) to medium-specific baseline data. Contaminants not eliminated during the first two phases of the screening process were compared to local baseline data (i.e., measured levels of contaminants in clay). If the mean concentration of a contaminant in facility surface soil samples was statistically higher (at the 95% level of confidence) than the mean level of that contaminant in facility clay samples as determined using a one-tailed t-test, that chemical was retained as a COPC. If a given chemical was not detected in clay but was detected in surface soil, that chemical was considered a COPC.

For surface soil, clay samples collected from the CWMCS facility during the Phase II investigation were used in these comparisons. **Phase I clay data were not used due to problems encountered during collection of these samples that rendered them invalid. Phase II clay sampling locations are shown in Fig 1-2, Part 1, Section 1 of the Final RCRA RFI.** Clay samples are appropriate for baseline comparisons because surface soils on the facility property or in the vicinity of the property have been contaminated as a result of historical waste disposal activities. Studies conducted in the Lake Calumet area (IDENR, 1988) have shown that Lake Calumet sediments have also been contaminated by past waste disposal activities. This study also showed that the sediment load to Lake Calumet has been significant. Consequently, clay samples represent baseline conditions prior to waste disposal activities either on the facility property or in the vicinity of the property.

Surface soil samples SS-11, SS-12, and SS-13 were originally identified as baseline samples, since they were taken from an undeveloped pier north (upgradient) of the facility boundary. The CWMCS facility and adjacent piers are constructed upon imported fill material consisting of construction rubble and other unclassified materials from unknown sources. Surficial soils taken from any of the man-made piers near the facility are not naturally occurring and may have originated from different sources over a long period of time. After evaluating chemical constituent levels in these samples and considering that the adjacent pier is made of man-made fill materials, it was determined that fill material, regardless of sample location, is not representative of local baseline conditions. During RFI investigations, it was determined that the Lake Calumet sediment depth is approximately 6 inches. Immediately beneath this sediment layer is the upper lacustrine unit, which is a natural deposit. For these reasons, the naturally-occurring "clay" layer was considered more representative of baseline conditions than samples taken from the imported fill material on an adjacent pier. For reference, analytical data for surface soil samples S-11, S-12, and S-13 are included in Appendix K.

Clay samples collected during Phase II of the facility investigation indicate that contamination from historical waste disposal activities has not migrated vertically. Twenty-three samples were collected at depths of five, 15, and 40 feet below the clay/fill contact. A total of seven volatile organic compounds (VOCs) and two phthalates were detected in the Phase II clay samples. Four of these VOCs (acetone, methylene chloride, methyl ethyl ketone, and trichlorofluoromethane) and one of the phthalates (bis(2-ethylhexyl)phthalate) are common laboratory artifacts. The upper samples (i.e., the samples collected at a depth of five feet below the clay/fill interface) contained no VOCs. This upper layer (the upper lacustrine unit) has been shown to be a homogenous, low permeability layer. This contaminant configuration indicates that vertical migration of contaminants from the fill has not occurred. The low levels of VOCs detected in samples taken from the lower lacustrine layer (15 feet below the interface) and the underlying clayey glacial till (40 feet below the interface) are believed to be sampling artifacts introduced by "drag down" of surficial soil contaminants during sampling. Metals were commonly measured in clay samples. The preponderance of metals throughout the clay and the fact that

similar levels were measured at the different levels indicate that measured levels represent naturally-occurring concentrations (Table 2-1 is a list of metal and organic constituents in collected clay samples).

While background levels of anthropogenic organic chemicals are assumed by USEPA to be zero, the ubiquity of some chemicals, particularly in urbanized or industrialized areas, requires that the contribution from other sources be considered. Therefore, data collected from the clay layers serve as the appropriate reference for comparison to facility organic and inorganic chemical concentrations in on-site surface soils. As a result of this process, potential hazards associated with exposure to only those chemicals present in facility surface soils in concentrations significantly greater than background, as noted in Section 2.1 of this report, were evaluated. This approach agrees with the following USEPA guidance, "All chemicals detected at concentrations exceeding background should be considered in the risk assessment" (Letter from Joseph M. Boyle to Kevin K. Hersey, May 15, 1992).

## **2.1 COPCs For Surface Soils and Air**

Biobed and baseline surface soil samples were analyzed for priority pollutant volatiles, metals, and semi-volatiles common to **40 CFR, Part 264, Appendix IX**, while surface soil samples for pier areas outside of the biobeds were analyzed for priority pollutant metals and semi-volatiles common to **40 CFR, Part 1, Appendix IX** (Figure 2-1).

Metals detected in surface soil samples include: antimony, arsenic, beryllium, cadmium, chromium, copper, lead, mercury, nickel, selenium, silver, thallium, and zinc. **A summary of metals levels in surface soil samples collected facility-wide is included in Appendix A.** Arsenic, beryllium, cadmium, chromium, copper, lead, nickel, silver, and zinc were detected in all 20 Phase II facility-related samples. Mercury and antimony were detected in 90% and 85% of the Phase II samples, respectively, while selenium and thallium were detected in 60% and 30% of the samples, respectively. **Hence, no metals were eliminated due to a low frequency of detection or based on a comparison of facility versus blank samples.** Maximum



metals levels in on-site samples ranged from 540  $\mu\text{g/kg}$  for mercury to 1,570,000  $\mu\text{g/kg}$  for zinc.

Most large environmental data sets have been shown to be lognormally versus normally distributed USEPA (1992d). A Kolmogorov-Smirnov (K-S) goodness of fit test using Lilliefors correction was used to determine if the data were normally or lognormally distributed. The K-S test was selected over the Shapiro-Wilk (or W) test, as it is a more powerful and robust statistical tool (Gilbert, 1987). The data were assumed to fit the distribution (normal or lognormal) if the results of the K-S test were significant at the 95% level of confidences. Results of the K-S test are shown in Table 2-2 for each chemical detected in facility surface soils. Table 2-2 shows that arsenic, cadmium, chromium, lead, mercury, nickel, selenium, and zinc are lognormally distributed. Beryllium and copper are normally distributed, while the data available for antimony, silver, and thallium did not fit any distribution at the 95% level of significance. Table 2-3 presents results of the t-tests done to compare measured levels of contaminants in facility surface soil samples with those in the clay samples obtained from the facility. Results of the t-test were considered significant at the 95% level of confidence regardless of whether chemical levels in clay were statistically higher. If the mean concentration of a chemical in clay was statistically higher than its mean concentration in surface soils (at the 0.05 level of confidence), that chemical was not considered a COPC. If the data for a given chemical were shown to be lognormally distributed, the t-test was done using logtransformed data [i.e.,  $\ln(x)$ ]. Table 2-3 shows that levels of arsenic, nickel, and thallium in facility surface soils were either significantly lower than or not significantly different from levels measured in baseline (clay) samples. Hence, beryllium, cadmium, chromium, copper, lead, mercury, selenium, silver, and zinc were retained as COPCs. Since antimony was not detected in clay but was detected in surface soils, it was also retained as a COPC.

Organic contaminants detected in more than five percent of on-site surface soil samples include: benzo(a)anthracene (BA), benzo(a)pyrene (BaP), benzo(b)fluoranthene, benzo(k)fluoranthene, bis(2-ethyl hexyl)phthalate (BEHP), chrysene, 1,1-dichloroethylene (1,1-DCE), di-n-butyl phthalate, fluoranthene, hexachlorobenzene (HCB), indeno(1,2,3-cd)pyrene, methylene chloride,

phenanthrene, pyrene, and trichloroethylene (TCE). A summary of organic compound levels in surface soils collected facility-wide is included in Appendix A. Of these 15 organic compounds, four (methylene chloride, indeno(1,2,3-cd)pyrene, 1,1-DCE, and TCE) were detected in 10% to 11% of the samples collected. BaP, benzo(k)fluoranthene, HCB, and BEHP were detected in 25% to 35% of the samples, while benzo(b)fluoranthene and BA were detected in 45% and 65% of the samples, respectively. Chrysene, fluoranthene, phenanthrene, pyrene, and di-n-butyl phthalate were detected in 75% to 95% of the samples analyzed. Hence, no organic compounds were eliminated based on a low frequency of detection. Maximum measured levels of organics in facility surface soils ranged from 3.7  $\mu\text{g}/\text{kg}$  for TCE to 404,000  $\mu\text{g}/\text{kg}$  for BEHP. Of the organic chemicals detected in facility surface soils, only BEHP, di-n-butyl phthalate, phenanthrene, and TCE were detected in at least 5% of the clay samples. Levels of BEHP and TCE measured in facility surface soils were not significantly different than levels measured in clay (Table 2-3); hence, they were eliminated as COPCs. Given that the area surrounding the CWMCS facility has historically been a heavily industrialized area, anthropogenic contamination of a variety organic chemicals is expected, especially given the heterogenous fill material used to create land surface around Lake Calumet. Numerous past and current sources of TCE other than the CWMCS facility are likely. In this case, use of statistical comparison to eliminate compounds not detected in facility samples at levels significantly higher than baseline levels is appropriate. Furthermore, the addition of TCE as a COPC would not alter risk estimates, since EPA has withdrawn all toxicity values for TCE from IRIS. Hence, risks associated with exposure to TCE cannot be evaluated quantitatively. Levels of di-n-butyl phthalate in clay were significantly higher than levels in surface soil; hence, di-n-butyl phthalate was also eliminated as a COPC. Conversely, surface soil levels of phenanthrene were significantly higher than clay level, so phenanthrene was considered a COPC. The remaining 11 organics detected in more than 5% of facility surface soil samples were not detected in clay samples, and hence, were retained as COPCs (Table 2-4).

Any chemical included as a COPC for surface soil was considered a COPC for fugitive dust in air. In addition, because organic chemicals can volatilize from subsurface regions, any chemical

detected in fill, the layer directly below the soil surface, or in the groundwater within the fill was also included as a COPC for air. Since collection of facility-specific air monitoring data is still underway evaluation of risks associated with the inhalation of organic vapor will be characterized following collection and validation of facility-specific monitoring data. Table 2-4 summarizes COPCs for surface soils.

**TABLE 2-1**  
**SUMMARY OF METAL AND ORGANIC CONSTITUENTS IN CLAY<sup>a</sup>**

<b>Chemical</b>	<b>Sample Size</b>	<b>Range (<math>\mu\text{g/kg}</math>)</b>	<b>Arithmetic Mean (<math>\mu\text{g/kg}</math>)<sup>b</sup></b>	<b>Standard Deviation (<math>\mu\text{g/kg}</math>)<sup>b</sup></b>	<b>95 Percent Upper Confidence Limit (<math>\mu\text{g/kg}</math>)<sup>b</sup></b>
<b>METALS</b>					
Antimony	23	ND (96%) - 3850	3550	157	3606
Arsenic	23	2900 - 18,000	10,430	3674	11,741
Beryllium	23	350 - 870	616	136	664
Cadmium	23	1400 - 7100	2644	1238	3085
Chromium	23	7700 - 23,000	14,791	3998	16,219
Copper	23	21,000 - 50,000	34,522	8675	37,619
Lead	23	10,000 - 49,000	20,391	7976	23,239
Mercury	23	ND (52%) - 100	49.5	11.2	53.5
Nickel	23	23,000 - 41,000	31,696	4704	33,375
Selenium	23	ND (35%) - 1600	406	354	533
Silver	23	ND (35%) - 650	591	28.8	602

<sup>a</sup> Only those chemicals that were detected in site surface soils are summarized in this table.

<sup>b</sup> Non-detect values were assumed to be equal to one-half the sample quantitation limit.

<sup>c</sup> All other organics detected in site surface soils were not detected in at least five percent of the clay samples analyzed.

**TABLE 2-1**  
**SUMMARY OF METAL AND ORGANIC CONSTITUENTS IN CLAY<sup>a</sup>**  
**- Continued -**

<b>Chemical</b>	<b>Sample Size</b>	<b>Range (µg/kg)</b>	<b>Arithmetic Mean (µg/kg)<sup>b</sup></b>	<b>Standard Deviation (µg/kg)<sup>b</sup></b>	<b>95 Percent Upper Confidence Limit (µg/kg)<sup>b</sup></b>
Thallium	23	ND (26%) - 1700	780	83	917
Zinc	23	45,000 - 100,000	62,130	14,458	67,337
<b>ORGANICS<sup>c</sup></b>					
Bis(2-ethylhexyl)phthalate	23	ND (42%) - 41,500	6142	8490	9174
Di-n-butyl phthalate	23	1900 - 17,600	5812	3941	7219
Phenanthrene	23	ND (61%) - 429	312	47	328
Trichloroethylene	23	ND (88%) - 47.9	3.3	9.7	6.8

<sup>a</sup> Only those chemicals that were detected in site surface soils are summarized in this table.

<sup>b</sup> Non-detect values were assumed to be equal to one-half the sample quantitation limit.

<sup>c</sup> All other organics detected in site surface soils were not detected in at least five percent of the clay samples analyzed.

**TABLE 2-2**  
**RESULTS OF THE KOLMOGOROV-SMIRNOV GOODNESS OF FIT TEST**  
**FOR METALS AND ORGANIC CHEMICALS OF POTENTIAL**  
**CONCERN IN FACILITY SURFACE SOILS**

Chemical	Distribution <sup>a</sup>	Significance Level <sup>b</sup>
<b>METALS</b>		
Arsenic	lognormal	0.933
Antimony	none <sup>c</sup>	---
Beryllium	normal	0.493
Cadmium	lognormal	0.354
Chromium	lognormal	0.055
Copper	normal	0.814
Lead	lognormal	0.610
Mercury	lognormal	0.081
Nickel	lognormal	0.327
Selenium	lognormal	0.181
Silver	none	---
Thallium	none	---
Zinc	lognormal	0.150

<sup>a</sup> Sample size was 20 (all surface soil samples collected within the CWMCS property).

<sup>b</sup> The data were assumed to fit the distribution (normal or lognormal) if the results of the K-S test were significant at the 95% level of confidence using the one-tailed unpaired student T-test.

<sup>c</sup> Chemical did not fit any distribution.

**TABLE 2-2**  
**RESULTS OF THE KOLMOGOROV-SMIRNOV GOODNESS OF FIT TEST**  
**FOR METALS AND ORGANIC CHEMICALS OF POTENTIAL**  
**CONCERN IN FACILITY SURFACE SOILS**  
**- Continued -**

Chemical	Distribution <sup>a</sup>	Significance Level <sup>b</sup>
<b>ORGANICS</b>		
Benz(o)anthracene	lognormal	0.299
Benzo(a)pyrene	normal	0.120
Benzo(b)fluoranthene	normal	0.431
Benzo(k)fluoranthene	none	---
Chrysene	normal	0.329
Fluoranthene	lognormal	1.000
Hexachlorobenzene	none	---
Indeno(1,2,3-cd)pyrene	none	---
Phenanthrene	lognormal	0.596
Methylene chloride	none	---
BEHP	none	---
Di-n-butyl phthalate	lognormal	1.000
Pyrene	lognormal	0.132
1,1-Dichloroethylene	none	
Trichloroethylene	none	---

<sup>a</sup> Sample size was 20 (all surface soil samples collected within the CWMCS property).

<sup>b</sup> The data were assumed to fit the distribution (normal or lognormal) if the results of the K-S test were significant at the 95% level of confidence using the one-tailed unpaired student T-test.

<sup>c</sup> Chemical did not fit any distribution.

**TABLE 2-3**  
**THE MEAN CONCENTRATION, STANDARD DEVIATION,**  
**AND RESULTS OF THE ONE-TAILED T-TEST FOR FACILITY SURFACE SOILS**

Chemical	Arithmetic Mean Clay Concentration <sup>a</sup> (µg/kg)	Standard Deviation Clay (µg/kg)	Arithmetic Mean Surface Soil Concentration <sup>b</sup> (µg/kg)	Standard Deviation Surface Soils (µg/kg)	Calculated t Value / Critical t Value	P Value <sup>c</sup>	Is This Chemical a COPC?
<b>METALS</b>							
Arsenic	10,430	3674	7155	8007	-3.469 / 2.02	0.0006	No <sup>d</sup>
Beryllium	616	136	1357	708	4.624 / 2.02	<0.0001	Yes <sup>e</sup>
Cadmium	2644	1238	8882	11,836	3.485 / 2.02	0.0006	Yes
Chromium	14,791	3998	416,295	450,975	7.489 / 2.02	<0.0001	Yes
Copper	34,522	8675	42,450	15,926	2.064 / 2.02	0.02	Yes
Lead	20,391	7976	164,450	271,412	6.675 / 2.02	<0.0001	Yes
Mercury	49.5	11.2	171	128	6.828 / 2.02	<0.0001	Yes
Nickel	31,696	4704	26,675	30,031	-3.150 / 2.02	0.0015	No <sup>d</sup>

<sup>a</sup> Mean of all 23 clay samples collected during Phase II investigations.

<sup>b</sup> Mean of all 20 surface soil samples collected within the CWMCS property (both inside and outside of the fence) but excluding the three soil samples collected north of the CWMCS property.

<sup>c</sup> Test was considered significant at the 95% level of confidence using the one-tailed unpaired student T-test.

<sup>d</sup> Mean clay concentration is significantly greater than the mean surface soil concentration; hence, that chemical is not considered a COPC.

<sup>e</sup> Mean surface soil concentration is significantly greater than the mean clay concentration; hence, that chemical is a COPC.

<sup>f</sup> There is no significant difference between the mean surface soil concentration and the mean clay concentration; hence that chemical is not a COPC.

NOTE: Some contaminants were detected in site surface soil samples but are not included in this table. These contaminants were excluded because they were not detected above current detection limits in more than five percent of the clay samples analyzed. Hence, these chemicals are considered COPCs.



**TABLE 2-3**  
**THE MEAN CONCENTRATION, STANDARD DEVIATION,**  
**AND RESULTS OF THE ONE-TAILED T-TEST FOR FACILITY SURFACE SOILS**  
**- Continued -**

Chemical	Arithmetic Mean Clay Concentration <sup>a</sup> (µg/kg)	Standard Deviation Clay (µg/kg)	Arithmetic Mean Surface Soil Concentration <sup>b</sup> (µg/kg)	Standard Deviation Surface Soils (µg/kg)	Calculated t Value / Critical t Value	P Value <sup>c</sup>	Is This Chemical a COPC?
Selenium	406	354	766	473	3.766 / 2.02	0.0003	Yes
Silver	578	67	1657	1207	3.245 / 2.02	0.001	Yes
Thallium	780	383	678	157	1.123 / 2.02	0.13	No <sup>f</sup>
Zinc	62,130	14,586	270,150	356,344	3.426 / 2.02	0.0007	Yes
<b>ORGANICS</b>							
BEHP	6143	8490	24,179	89,475	0.378 / 2.02	0.36	No <sup>f</sup>
Di-n-butyl phthalate	5182	3941	3204	2380	-4.167 / 2.02	<0.0001	No <sup>d</sup>
Phenanthrene	312	47	3223	4352	5.307 / 2.02	<0.0001	Yes

<sup>a</sup> Mean of all 23 clay samples collected during Phase II investigations.

<sup>b</sup> Mean of all 20 surface soil samples collected within the CWMCS property (both inside and outside of the fence) but excluding the three soil samples collected north of the CWMCS property.

<sup>c</sup> Test was considered significant at the 95% level of confidence using the one-tailed unpaired student T-test.

<sup>d</sup> Mean clay concentration is significantly greater than the mean surface soil concentration; hence, that chemical is not considered a COPC.

<sup>e</sup> Mean surface soil concentration is significantly greater than the mean clay concentration; hence, that chemical is a COPC.

<sup>f</sup> There is no significant difference between the mean surface soil concentration and the mean clay concentration; hence that chemical is not a COPC.

NOTE: Some contaminants were detected in site surface soil samples but are not included in this table. These contaminants were excluded because they were not detected above current detection limits in more than five percent of the clay samples analyzed. Hence, these chemicals are considered COPCs.

**TABLE 2-3**  
**THE MEAN CONCENTRATION, STANDARD DEVIATION,**  
**AND RESULTS OF THE ONE-TAILED T-TEST FOR FACILITY SURFACE SOILS**  
**- Continued -**

<b>Chemical</b>	<b>Arithmetic Mean Clay Concentration<sup>a</sup> (µg/kg)</b>	<b>Standard Deviation Clay (µg/kg)</b>	<b>Arithmetic Mean Surface Soil Concentration<sup>b</sup> (µg/kg)</b>	<b>Standard Deviation Surface Soils (µg/kg)</b>	<b>Calculated t Value / Critical t Value</b>	<b>P Value<sup>c</sup></b>	<b>Is This Chemical a COPC?</b>
TCE	3.3	9.7	1.4	0.7	0.846 / 2.02	0.20	No <sup>f</sup>

<sup>a</sup> Mean of all 23 clay samples collected during Phase II investigations.

<sup>b</sup> Mean of all 20 surface soil samples collected within the CWMCS property (both inside and outside of the fence) but excluding the three soil samples collected north of the CWMCS property.

<sup>c</sup> Test was considered significant at the 95% level of confidence using the one-tailed unpaired student T-test.

<sup>d</sup> Mean clay concentration is significantly greater than the mean surface soil concentration; hence, that chemical is not considered a COPC.

<sup>e</sup> Mean surface soil concentration is significantly greater than the mean clay concentration; hence, that chemical is a COPC.

<sup>f</sup> There is no significant difference between the mean surface soil concentration and the mean clay concentration; hence that chemical is not a COPC.

NOTE: Some contaminants were detected in site surface soil samples but are not included in this table. These contaminants were excluded because they were not detected above current detection limits in more than five percent of the clay samples analyzed. Hence, these chemicals are considered COPCs.

**TABLE 2-4**  
**SUMMARY OF CHEMICALS OF POTENTIAL CONCERN**  
**SURFACE SOILS**

Compound	Soil
<b>METALS</b>	
Antimony	X
Beryllium	X
Cadmium	X
Chromium	X
Copper	X
Lead	X
Mercury	X
Selenium	X
Silver	X
Zinc	X
<b>ORGANICS</b>	
Benzo(a)anthracene	X
Benzo(a)pyrene (BaP)	X
Benzo(b)fluoranthene	X
Benzo(k)fluoranthene	X
Chrysene	X
1,1-Dichloroethylene (1,1-DCE)	X
Fluoranthene	X
Hexachlorobenzene (HCB)	X
Indeno(1,2,3-cd)pyrene	X
Methylene chloride	X
Phenanthrene	X
Pyrene	X



### **3.0 EXPOSURE ASSESSMENT**

The objective of the exposure assessment is to estimate the magnitude, frequency, duration, and routes of human exposure to facility-related chemicals. Accomplishing this task involves completing these steps:

- Characterizing the exposure setting;
- Identifying potential human receptors;
- Characterizing pathways and routes of exposure;
- Estimating exposure-point concentrations; and
- Estimating total contaminant intake by potentially-exposed individuals for all relevant pathways of exposure.

USEPA (1989a) guidelines recommend that the exposure assessment consider both current and future risks to human health. Although it is unlikely that future land use will differ significantly from current practices, both current and hypothetical future land use scenarios are presented and analyzed in this assessment. The focus of the assessment is on chronic (long-term) exposures, as chronic estimates are of primary importance in evaluating current and long-term future exposures to facility-related chemicals. Acute or subchronic effects were evaluated only for individuals who may be exposed to facility-related COPCs for less than seven years (USEPA, 1989a).

#### **3.1 Identification of Potentially-Exposed Populations**

A number of unique features associated with the CWMCS facility limit the number of individuals who might be exposed to facility-related chemicals. Given the observed distribution of contaminants in the area of this facility and that none of the contaminated areas are readily accessible by the public, exposure by members of the public is not likely. The facility is located in an area that is zoned heavy industrial and used almost exclusively for waste management

operations. As mentioned earlier, the Paxton II Landfill was a solid waste and non-hazardous waste disposal facility located east of the site. Immediately south of the facility is the Clean Harbors of Chicago Inc. facility, which uses chemical processes to remove heavy metals and suspended solids from aqueous and organic waste streams. The Land & Lakes Landfill is located immediately south of the Paxton II Landfill. Directly east of the Land & Lakes Landfill is the Paxton Avenue Lagoons site, which is undergoing remediation by the State of Illinois. Vacant land surrounding the facility is primarily undeveloped land or wetlands. The nearest residential dwellings are approximately 0.8-mile northeast of the facility (Fig. 2-2). Future development of this facility is not compatible with residential development in an area that is zoned for heavy industrial use and includes an incinerator, several solid waste landfills, and other chemical plants. The CWMCS facility as well as the areas surrounding Lake Calumet are zoned for heavy industrial use by the City of Chicago. In addition, the proposed City of Chicago Long Range Land-Use Plan identifies the Lake Calumet Region as an industrial corridor which is proposed to be maintained in an industrial land-use indefinitely into the future. The proposed City of Chicago Long Range Land-Use Plan is scheduled to be adopted by the city in 1994. In addition, the Northeastern Illinois Planning Commission (NIPC) which is responsible for developing and coordinating local and regional land use policies has also identified the Lake Calumet Region for continued industrial land use. This policy is identified as the NIPC Regional Land-Use Policy Plan (updated March 21, 1984). USEPA (1989a) specifies, "An assumption of future residential land use may not be justifiable if the probability that the facility will support residential use in the future is exceedingly small." Thus, the combination of deed restrictions required by RCRA, the responsibilities associated with regulated land disposal units, and the industrialized nature of the surrounding area makes future residential development of this facility highly improbable. Hence, future use of this facility is expected to remain commercial/industrial.

The CWMCS facility is located on approximately 30 acres of land built on fill on the eastern shore of Lake Calumet. Groundwater at the facility is in hydraulic connection with Lake Calumet. Pursuant to 35 Illinois Administrative Code 303.441(f), Lake Calumet is classified as a secondary contact water body which is defined as "any recreational or other water use in

which contact with the water is either incidental or accidental and in which the probability of ingesting appreciable quantities of water is minimal such as fishing, commercial and recreational boating, and any limited contact incident to shoreline activity." Given this facility information, four potentially-exposed populations have been identified for this facility. They include the following:

- Facility workers
- Trespassers
- Off-site residents
- Recreational users of Lake Calumet.

### **3.1.1 Facility Workers**

Individuals who work at the facility could potentially be exposed to facility-related contaminants released from the former SWMUs. Three worker groups with different potential levels of exposure were evaluated. Two groups, incineration workers and security personnel, typically remain within the fenced portion of the facility [i.e., they do not typically go onto the unfenced portion of the pier that extends out into Lake Calumet. This unfenced area includes the vault constructed by SCA and open land occupied by the former wastewater basin #2 (SWMU #6)]. Security personnel may routinely patrol the entire perimeter of the fenced-in portion of the facility. Finally, remedial (closure) activities were conducted for interim status surface impoundments at the facility from October 1992 through October 1993. Risks to these short-term remediation workers potentially posed by exposure to facility-related COPCs were also included in this assessment. These workers normally had access to a small area within the fenced portion of the facility and were only considered under the current exposure scenario.

### **3.1.2 Trespassers**

Although the active portion of the facility is fenced, the western portion of the pier is unfenced and extends into Lake Calumet, making it potentially accessible to trespassers. The pier offers little attraction to trespassers; however, as the open, unfenced area is covered with tall, weedy vegetation most of the year. The only means of accessing this portion of the facility is by boat or by wading across the water. Although the water level around the facility can drop during dry months, individuals would usually have to wade through about three feet of water. The land edge is relatively steep and rocky versus being flat or beach-like. Furthermore, trespassing was not considered likely during the harsh winter months (i.e., December through March) when portions of Lake Calumet freeze. Access from the active (land end) of the facility is not likely, because the area is fenced and secure. In addition, since the area is routinely patrolled by security personnel, potential trespassers would be identified and escorted from the area. Thus, potential exposures by individuals who might access the open end of the pier were considered negligible.

### **3.1.3 Recreational Users**

Shallow groundwater beneath the facility is believed to discharge into Lake Calumet; therefore, there is a potential that facility-related chemicals present in surface water and sediment could bioaccumulate in aquatic organisms. Although there is no commercial boat traffic on Lake Calumet in the area of the facility, portions of Lake Calumet are used for recreational fishing. Fishermen have been observed fishing in Lake Calumet near the CWMCS facility. These individuals may come into contact with contaminated sediments while standing at the edge of or wading into Lake Calumet. These receptors may also be exposed to contaminated surface water. This potential exposure pathway was not quantified, however, since very little contamination was detected in surface water near the CWMCS facility (CWMCS, 1993).

Although ingestion of fish taken from areas of Lake Calumet adjacent to the CWMCS facility is possible, this pathway is highly uncertain and difficult to quantify for several reasons.



Potential exposures associated with ingestion fish taken from Lake Calumet were not evaluated for the following reasons.

1. Fish tissue samples were not collected as part of the RFI, because it would be impossible to confidently attribute any chemical contamination measured in fish to any one source. In addition to more than a century of industrial activity along Lake Calumet, this lake is currently impacted by a variety of non-point sources, including highway runoff, surface runoff from industrial properties, and seepage of contaminated groundwater from nearby landfills, dumps, waste lagoons, and underground storage tanks (IDENR, 1988). Nor is it realistic to measure chemical levels in fish taken from waters adjacent to any facility located near Lake Calumet and assume that potential impacts are due only to releases from that facility. Thus, while the occasional recreational fisherman is expected to represent the population most likely to be exposed to potential contaminants in surface water and sediment, subsequent human exposures from the ingestion of fish contaminated due to release from a single source cannot be readily and unequivocally evaluated in this assessment.
2. Very little contamination was detected in surface water (See Section \_\_ of the RFI). Given that a) uptake of contaminants across the gill membrane from water is the primary route by which fish are exposed to and accumulate contaminants and b) very little contamination was detected in surface water near the CWMCS facility, fish tissue levels resulting from exposure to contaminated surface water near the CWMCS facility are expected to be low.
3. Although the sediments near the facility do contain detectable levels of facility-related COPCs, USEPA agreed that "to model the transfer of contamination from sediments to aquatic life would involve significant uncertainties."

Given the industrial nature of the area and IEPA's classification of Lake Calumet as a secondary contact water body, it is considered highly unlikely that other recreational water contact activities would occur. It is unlikely that individuals would swim in Lake Calumet at all much less spend a substantial portion of time swimming in areas near the CWMCS facility. Therefore, direct ingestion of surface water/sediment and dermal contact with surface water and sediment are considered incomplete exposure pathways.

#### **3.1.4 Residents Living in Proximity to the Facility**

It is highly unlikely that future residential development would occur in the direction of the facility given the highly industrialized nature of the area surrounding the facility and the City of Chicago proposed land use plan, and the NIPC Regional Land-Use which calls for continued industrial land use in the area, which is described in Section 3.1 of this document. Exposures by individuals to facility-related COPCs living within a one-mile radius of the facility are also expected to be small. Currently, the nearest residential dwelling is located approximately 0.8-mile northeast of the facility. Facility-related COPCs could potentially be transported off-site in the air as a result of fugitive dust entrainment or volatilization from surface soil or subsurface fill.

### **3.2 Identification of Complete Exposure Pathways**

Potential exposure pathways encompass the route and media through which contaminants move from a source to reach potential receptors. For an exposure pathway to be considered complete, it must have each of the following components: (1) a source, (2) a mechanism of potential contaminant release, (3) a retention or transport medium, (4) a point of potential contact, and (5) an exposure route at the potential contact point. Under current conditions, two potentially-exposed receptor populations have been identified: on-site workers and off-site residents living in the vicinity of the facility. Exposure pathways that were evaluated for current and future receptors and the rationale for considering these pathways are discussed in Table 3-1.

Since residents currently obtain their drinking water from municipal sources, ingestion of contaminated groundwater as drinking water is not a complete exposure pathway. There are very few production wells within a one-mile radius of the facility because: (1) of the ready availability of Chicago City (municipal) water, and (2) much of the surrounding land, although zoned industrial, is undeveloped. An Illinois State Water Survey indicated that within the township in which the facility is located, no groundwater is drawn for public use, although 54,000 gallons a day are pumped for industrial (non-consumption) purposes (CWMCS, 1993). As a result, no impact on human health from groundwater use in the area is expected. Furthermore, no livestock or agricultural crops occur within 0.8 miles of the facility. Thus, the

potential for indirect human exposure to facility-related hazardous chemicals through the food chain is negligible. The only complete exposure pathway for off-site residents living in the vicinity of the facility is inhalation of facility-related chemicals present in the air as a consequence of resuspension of surface soils or volatilization of chemicals present in surface soil, subsurface fill, or shallow groundwater. Lowe *et al.* (1991) showed that the maximum ground level air concentrations resulting from emissions from a proposed municipal waste incinerator occurred 500 meters away from the source (stack). Maximum air level concentrations resulting from a ground level area source (such as the CWM facility) would be less than 500 meters. Because the nearest residential dwelling is 0.8 mile from the facility, fugitive dust that may be resuspended from the soil surface is not expected to be transported to off-site residential areas. Therefore, inhalation of particulates by off-site residential receptors was not quantitatively evaluated.

For on-site workers, a number of exposure pathways are complete. As some areas of the facility are unpaved, workers could come in direct contact with surface soil. This could potentially result in dermal contact with and incidental ingestion of COPCs present in that medium. In addition, on-site workers could potentially be exposed to chemicals as a result of inhalation of both fugitive dust (particulates) and airborne vapors. Although it is possible that workers could come in contact with subsurface materials (e.g., while participating in construction activities), these exposures occur infrequently and are of a short duration. Thus, exposures to facility-related contaminants in subsurface materials are expected to be minor relative to the other complete pathways discussed above and were not quantitatively evaluated. Potential exposures by individuals who may be exposed to facility-related contaminants in subsurface materials during future remediation of this facility will be evaluated in the Corrective Measures Study, if necessary. Conversely, since the shallow groundwater has been classified as non-potable by IEPA (IEPA, 1993) and workers do not use the groundwater for washing, ingestion of and dermal contact with groundwater, as well as inhalation of organic vapors while showering or washing, are not complete exposure pathways.

As discussed in Section 3.1, future use of the facility is expected to remain commercial/industrial. Two hypothetical future worker scenarios were quantified. First, facility-specific exposure frequency and duration data provided by CWMCS were used to calculate exposures by individuals assuming operation of the incinerator. Individuals were assumed to work on-site in unpaved areas where they could potentially be exposed two hours a day, five days a week, 50 weeks a year for eight years (the period of operation for the CWM facility). Secondly, the more conservative default exposure scenario in which individuals are assumed to work on-site eight hours a day, five days a week, 50 weeks a year for 25 years (USEPA, 1991) was also quantified. It was assumed that future workers will not consume the local groundwater either, since drinking water will be available from the City of Chicago. Therefore, complete exposure pathways for the hypothetical future worker are the same as those described for the current worker.

### **3.3 Estimating Exposure Point Concentrations**

Exposure point concentrations are the upper-bound estimates of chemical concentrations in the various environmental media to which humans may be exposed. They represent the concentrations of chemicals potentially ingested, inhaled, or contacted dermally. These concentrations are based on monitoring data obtained during the RFI investigations.

The reasonable maximum exposure (RME) scenario, which is defined as the highest exposure that is reasonably expected to occur at a facility (i.e., well above average) (USEPA, 1989a), was used to quantify current and future risks to receptors. Since the RME scenario uses a mixture of conservative (health-protective) assumptions and upper-bound environmental concentration data, it is expected to overestimate actual exposures. The rationale for evaluating the RME scenario, however, is that the risk estimates obtained represent the highest risk to which any individual would be potentially subjected. Thus, the RME scenario is viewed as a very conservative approach, since the actual human health risks encountered are likely to be lower than those estimated using RME assumptions and data.

USEPA defines the concentration used to estimate RME exposures to a chemical as the 95 percent upper confidence limit (UCL) of the arithmetic mean (USEPA, 1992d) or the maximum observed concentration, whichever is less. Arithmetic mean concentrations are typically used because: (1) they represent the most reasonable estimate for comparison with chronic non-carcinogenic and carcinogenic effects criteria, and (2) they represent a reasonable estimate of the concentration to which individuals are likely to be exposed over time.

A Kolmogorov-Smirnov (K-S) goodness of fit test using Lilliefors correction was used to determine if the data were normally or lognormally distributed (Gilbert, 1987). Results of the K-S test are shown in Table 3-2 for each chemical detected in on-site surface soils ( $n = 20$ ). The nonparametric Kolmogorov-Smirnov (KS) goodness-of-fit test with Lilliefors correction is an effective method for testing whether a data set has been drawn from an underlying normal distribution or a lognormal distribution if the data has been log transformed. The K-S test was selected because it is more robust than the Chi Square Goodness of Fit test. The sample distribution is curve fit against the true distribution and the maximum difference between the two distributions is used to calculate the goodness of fit. The Lilliefors correction is used to calculate the parameters needed to calculate the true mean and standard deviation of the data set. The significance level indicates that, at the 95% level of confidence, the data set is statistically similar to a normal or a lognormal distribution (i.e., the data set is normally or lognormally distributed), or the data set is statistically different from a normal or a lognormal distribution (i.e., the data set does not fit one of the two distributions). A significance level (Column 4 of Table 3-2) greater than 0.05 indicates that the data set fits the distribution specified in Column 3. Conversely, if the significance level is less than 0.05, no relationship can be drawn from the data set. If the data for a given chemical were shown to be normally distributed, UCL values were calculated using a one-sided confidence limit for the arithmetic mean (Gilbert, 1987) as demonstrated in this equation:

$$UCL = \bar{x} + t_{1-\alpha, n-1} \frac{s}{\sqrt{n}} \quad (3-1)$$

where  $\bar{x}$  is the arithmetic mean,  $s$  is the standard deviation of the arithmetic mean,  $n$  is sample size,  $t$  is the critical value of  $t$  for  $n-1$  degrees of freedom at the 95 percent level of confidence, and  $n$  is the number of samples. To calculate the UCL for chemicals that were shown to be lognormally distributed, the data were first transformed using the natural logarithm function [ $\ln(x)$  where  $x$  is a value from the data set] and the following equation (Gilbert, 1987):

$$UCL = e^{(\bar{x} + 0.5 s^2 + sH/\sqrt{n-1})} \quad (3-2)$$

where  $e$  is the base of the natural log (2.718),  $\bar{x}$  is the arithmetic mean of the log transformed data,  $s$  is the standard deviation of the transformed data,  $H$  is the  $H$  statistic from Gilbert (1987), and  $n$  is the number of samples. If the data fit neither a normal or a lognormal distribution (i.e., those labeled as "none" in Column 2 of Table 3-2), then a 95 percent confidence level was calculated assuming that the data were normally and lognormally distributed, and the higher UCL value was used in exposure calculations.

In both cases, analytical results below the method detection limit were treated as equal to one-half the sample quantitation limit (SQL) and included in the calculation of mean and UCL values (USEPA, 1992a). Sampling results characterized with a "B" qualifier for inorganics or "J" qualifier for organics (i.e., the true value is less than the contract required quantitation limit but greater than the instrument detection limit) were also used in mean and upper-bound calculations. It is important to recognize that small data sets often have a large variance; consequently, the UCL may exceed the maximum value. In this case, USEPA (1989a; 1992d) recommends use of the maximum observed concentration of the affected COPC in the RME estimate.

A second, and more plausible, exposure scenario considered is the average scenario, which uses best-estimates (usually mean values) of the exposure assumptions to characterize human exposures (USEPA, 1992c). This exposure scenario is used to quantify more realistic estimates of human health risk in cases where unacceptable risks were associated with RME estimates. The advantage of evaluating two exposure scenarios is that together they provide a broader perspective on the range of risks likely to be experienced by individuals potentially exposed to facility-related chemicals.

The results of the exposure assessment are presented as intake rates in milligrams of chemical per kilogram of body weight per day (mg/kg-day) for two different averaging periods: (1) intakes averaged over a 70-year period to assess lifetime cancer risks, and (2) intake rates averaged over the exposure duration (ED) used to assess non-cancer effects (USEPA, 1989a). The analytical data used to calculate exposure point concentrations for all media are included in Appendix 1 of the report.

### 3.3.1 Exposure Point Concentrations for Soil

Surface soil data for COPCs exist for sampling locations within the fenced (active) portion of the facility as well as for locations outside the fence along the pier. Exposures by all current workers (impoundment remediation, incinerator, and security personnel) were restricted to surface soils within the perimeter of the fence, **since these individuals do not go outside of the fenced area.** Therefore, exposure point concentrations for these three receptor groups were based on the following 11 surface soil samples: SS-1, SS-2, SS-3, SS-4, SS-5, SS-14, SS-15, SS-16, SS-17, SS-20, and SS-21 (Fig 2-1). **This approach is appropriate, since (1) current workers have no process-related reason to go outside of the fence, and (2) HCB, a potential human carcinogen, is present in the three additional soil samples included in the analysis.** Information on sample size, detection frequency, range, mean, standard deviation, UCL concentrations, **maximum measured value, and the exposure-point concentration derived for each COPC used to model intakes by current workers** is summarized in Table 3-3. The

maximum measured value was used as the exposure-point concentration if the calculated 95% UCL exceeded the maximum value.

Since, future workers could use the entire facility, potential risks to these receptors, exposure point concentrations for these receptors were derived using all 20 surface soil samples collected at the CWMCS facility (i.e., both those inside and outside of the fence). Information on sample size, detection frequency, range, mean, standard deviation, UCL concentrations, maximum measured value, and the exposure-point concentration derived for each COPC used to model intakes by future workers is summarized in Table 3-4.

### 3.3.2 Exposure Point Concentrations for Air

As discussed earlier, COPCs present in facility soils have the potential for release into the air. Two mechanisms can be involved. The first involves wind-blown entrainment of small diameter surface soil particles. The second involves volatilization of COPCs present in surface soil, subsurface fill, or shallow groundwater. Exposures due to inhalation of particulate matter are discussed below, while exposures via inhalation of organic vapors will be evaluated in Appendix O of the RFI report (CWMCS, 1993).

The transport of contaminants from surface soil to the atmosphere is primarily a function of wind erosion and mechanical disturbances. Particulate emissions were expected to result primarily from wind erosion for the following reasons. One, current levels of vehicular traffic were assumed to be negligible relative to impacts from wind erosion. Since vehicular traffic is almost exclusively limited to paved areas of the facility, this source contributes minimally to airborne particulate emissions. Two, CWMCS maintains a Fugitive Particulate Operating Program (FPOP) at the facility in accordance with environmental regulations promulgated by the State of Illinois. The implementation of procedures specified in the FPOP continues to be effective in controlling fugitive emissions that may result from vehicular traffic or construction activities. Three, for any major construction activities that may occur at the facility, requirements to control fugitive emissions are



specific included in the project plan to ensure that unacceptable levels of these emissions do not occur. For these reasons, the concentration of facility-related COPCs in fugitive dust was based on wind erosion.

This section describes the model used to estimate particulate emissions generated by wind erosion. The particulate emission factor (PEF) relates the concentration of COPCs in soil to the concentration of COPCs in respirable particulates (PM<sub>10</sub>) in air due to fugitive dust emissions from the surface contamination sites (USEPA, 1991b). The PEF was calculated using Equation 3-3, which is representative of a site with "unlimited erosion potential." Unlimited erosion potential is characterized by a bare surface with finely divided particulates, such as sandy soil with a large number of erodible particles. Since specific grain size data on surface soils were not available per EPA guidance, the following equation was used to establish a particulate emission factor for an unlimited erosion potential.

$$PEF = \frac{W \times V \times DH \times 3600 \text{ sec/hr}}{A} \times \frac{1000 \text{ g/kg}}{RF \times (1-G) \times (U_m/U_t)^3 \times F(x)} \quad (3-3)$$

where: PEF = Particulate emission factor (m<sup>3</sup>/kg);  
W = Width of the contaminated area (m);  
V = Wind speed in the mixing zone (m/sec);  
DH = Diffusion height (m);  
A = Area of contamination (m<sup>2</sup>);  
RF = Flux of particulates in the respirable fraction (g/m<sup>2</sup>-hr);  
G = Fraction of vegetative cover (unitless);  
U<sub>m</sub> = Mean annual wind speed (m/sec);  
U<sub>t</sub> = Equivalent threshold value of wind speed at 10 m (m/sec);  
F(x) = Function dependent on U<sub>m</sub>/U<sub>t</sub> (unitless).

Particulates tend to erode at low wind speeds from these surfaces, and particulate emission rates are relatively independent of time at a given wind speed (USEPA, 1991b). USEPA (1985a) reported an annual average precipitation of 120 days of more than 0.01 inch in Chicago. This approach is conservative since it does not account for precipitation which would limit fugitive dust emission. The area of contamination (A) was assumed to be the entire facility, although

the fraction of the facility covered by grass or concrete was assumed to be 50% (i.e.,  $G=0.5$ ). Hence, the area assumed to be available to release fugitive dust was 93,025 m<sup>2</sup>. Using site-specific data, A and W were set equal to 186,050 m<sup>2</sup> and 305 m, respectively. In addition, the following default values reported in USEPA (1991b) were used for the remaining variables for which site-specific data were not available:

$$\begin{aligned} V &= 2.25 \text{ m/sec} \\ DH &= 2 \text{ m} \\ RF &= 0.036 \text{ g/m}^2\text{-hr} \\ U_m &= 4.5 \text{ m/sec} \\ U_t &= 12.8 \text{ m/sec} \\ F(x) &= 0.0497. \end{aligned}$$

Meteorological data collected from the Midway Airport were not used, as initially intended, for the following reasons. When the National Climatic Data Center was contacted, it indicated that the data is routinely collected on paper with one day of meteorological measurements written per page. Therefore, the data would have to be entered into a compatible computer format, and the modeler would have to determine the appropriate mixing height and stability classes for the data set. Since this task would be very time consuming, EPA default meteorological data were used. Use of these default data are expected to yield higher air concentration estimates than those predicted using the Midway Airport data.

Using these data and Equation 3-3, the facility-specific PEF was estimated to be  $6.83 \times 10^8 \text{ m}^3/\text{kg}$ . The concentration of COPCs in air was estimated using the equation (USEPA, 1991b):

$$CA \text{ (mg/m}^3\text{)} = \frac{CS \text{ (mg/kg)}}{PEF \text{ (m}^3\text{/kg)}} \quad (3-4)$$

where CS is the site-specific measured concentration of COPCs in surface soils. The measured concentration of COPCs in surface soil facility-wide were used, since resuspension of soil particulates via wind could potentially occur in areas of the facility not covered by vegetation

or concrete. The upper-bound or maximum (whichever was lower) value and the geometric or arithmetic mean (depending on the distribution of the data for that chemical; see Table 3-2) were used to derive the chemical-specific concentration of facility-related contaminants in air listed in Table 3-5. **These predicted air concentrations, which are based on all 20 surface soil samples collected facility-wide (Table 3-4) were used to model inhalation intakes by both current and future receptor groups. All surface soil data were used, since the wind erosion of particulates could occur both inside and outside of the fence.**

### **3.4 Estimation of Chemical Intakes**

This section describes the methods used to calculate intakes of COPCs by potentially-exposed populations via the complete exposure pathways selected for quantitative evaluation. Chronic daily intakes were estimated using standard USEPA (1989a) exposure equations. Calculated intakes are expressed as the amount of chemical actually taken into the body instead of the amount that is absorbed through the lung or gut once the chemical has been inhaled or ingested. This method of calculating exposures is consistent with USEPA (1989a) guidance and the numerical toxicity values presented in Section 4.0.

Current worker exposures were derived using the facility-specific exposure data provided by CWMCS. It was assumed for this assessment that current and future on-site workers would follow OSHA rules and regulations (29 CFR, Part 1926) while performing work-related duties. OSHA regulations required the use personal protective equipment (PPE) to limit or prevent exposure to hazardous constituents. While ownership and work practices may change in a future industrial use scenario, OSHA regulations play a substantial role in protecting workers, both current and future. OSHA requires employers to perform a hazard assessment of possible workplace hazards. If a potential hazard may be present, the employer must select and ensure that employees use appropriate PPE. While CWMCS acknowledges that the use of PPE is not foolproof, any exposure to contamination that may occur in these situations would be of short duration. Hence, the parameters and assumptions used to model exposures by current and future workers reflect the judgment

that OSHA regulations are followed. An averaging time of 25,550 days [365 days a year times 70 years (lifetime)] was used to model exposures to carcinogens, while an averaging time of exposure duration (in years) times 365 days per year was used for non-carcinogenic COPCs. Spreadsheet calculations of intakes for all receptor groups and all pathways are included in Appendix B of this report.

### 3.4.1 Modeling Exposures from Soil-Related Pathways

Individuals who come in contact with surface soils containing COPCs can potentially be exposed via incidental ingestion and dermal absorption. Dermal absorption could result from the adherence of soil to exposed skin surfaces while incidental ingestion can result from inadvertent hand-to-mouth transfer of soil during work-related and recreational activities.

#### 3.4.1.1 Incidental Ingestion of Soil

Individuals can be exposed to contaminants by inadvertent hand-to-mouth transfer of soil. Chronic daily intake from ingesting contaminated soil was calculated using the following equation (USEPA, 1989a):

$$I = \frac{CS \times IR \times CF \times FI \times EF \times ED}{AT \times BW} \quad (3-5)$$

where: I = intake from ingestion contaminated soil/dust (mg/kg/day);  
CS = concentration of chemical in soil (mg/kg);  
IR = ingestion rate (mg soil/day);  
CF = conversion factor ( $10^{-6}$  kg/mg);  
FI = fraction ingested from contaminated area (unitless);  
EF = exposure frequency (days/year);  
ED = exposure duration (years);  
AT = averaging time, or the period over which exposure is averaged (days);  
BW = body weight (kg).

Exposure-point concentrations listed in Tables 3-3 and 3-4 were used to model exposures via this pathway. Parameters used to model intakes via incidental ingestion of soil are summarized in Table 3-6 for all receptor groups. The ingestion rate of 50 mg/day was used for all workers and both the RME and average exposure scenarios (USEPA, 1991a). Although USEPA (1991a) states that "For certain outdoor activities in the commercial/industrial setting (e.g., construction or landscaping), a soil ingestion rate of 480 mg per day may be used" the 50 mg/day ingestion rate was deemed a more appropriate value for all workers given the health and safety precautions required for construction activities. Furthermore, the 50 mg/day value has an empirical basis (Calabrese et al., 1990), while the 480 mg/day value does not. CWMCS reported that remediation workers were present on-site 10-hours a day, 6-days a week for 50 weeks. When the incinerator operates, operations personnel who work in the incineration complex spend about eight hours a day outside (2 hours a day in unpaved areas), 5 days a week, 50 weeks a year. Individual plant security personnel are reported to be outside eight hours a day (1 hour a day in unpaved areas), five days a week, for 50 weeks. Using this facility-specific data for the length of time workers spend on-site, time-weighted average FI values based on an 8-hour workday were calculated. For example, if an operations employee works on-site two hours a day in unpaved areas, FI was assumed to be 0.25 (2 hours/day divided by 8 working hours/day). This approach assumes that workers are not exposed to facility-emitted contaminants while working in paved areas or when they are not at work. The FI represents the length of time individuals spend on-site. Since a time-weighted FI value of 1.0 indicates that individuals work the default eight-hour day, the 1.5 value indicates that remediation workers were on-site more than the standard eight-hour workday. Similarly, FI values less than 1 indicate that workers are on-site less than the standard eight-hour workday. CWMCS reported that the average length of employment for incineration workers is three years. CWMCS has operated the incinerator and auxiliary equipment on the property since 1985. Hence, an exposure duration of eight years was used to model exposures by all on-site workers except temporary remediation workers assuming RME conditions, while an exposure duration of three years was used for the average scenario.

#### *3.4.1.2 Dermal Contact with Soil*

Because dermal contact with contaminants in soil will not result in an adverse effect unless contaminants are absorbed through the skin, the following equation is used to estimate the amount of chemical absorbed through the skin (USEPA, 1989a):

$$AD = \frac{CFD \times CF1 \times CF2 \times SA \times AF \times ABS \times EF \times ED}{BW \times AT} \quad (3-6)$$

where: AD = absorbed dose (mg/kg-day);  
 CFD = concentration of chemical in fugitive dust (mg/m<sup>3</sup>);  
 CF1 = conversion factor 1 to convert CFD in mg/m<sup>3</sup> to mg/kg [(m<sup>3</sup>/1000 L) (L/1.29g) (1000 g/kg)], where 1.29 g/L is the density of air;  
 CF2 = conversion factor 2 (10<sup>-6</sup> kg/mg);  
 SA = skin surface area available for contact (cm<sup>2</sup>);  
 AF = soil-to-skin adherence factor (mg/cm<sup>2</sup>-event);  
 ABS = absorption factor (unitless);  
 EF = exposure frequency (events/yr);  
 ED = exposure duration (yr);  
 BW = body weight (kg);  
 AT = averaging time (days).

Since current and future operations and security personnel do not come into direct dermal contact with soil (i.e., they do not dig or work directly with soil), exposures are assumed to be restricted to contact with fugitive dusts. The impoundment remediation workers did come into contact with surface soils. Hence, the concentration of COPCs in fugitive dust presented in Table 3-5 and Equation 3-6 were used to model exposures by current and future incineration and security workers. The concentration of COPCs in fugitive dust in mg/m<sup>3</sup> was converted to units of mg/kg using the following conversion factors: [(m<sup>3</sup>/1000 L) (L/1.29 g) (1000 g/kg)] where 1.29 g/L is the density of air. These conversion factors are included in Equation 3-6 as CF1. Converting the concentration of COPCs in fugitive dust to mg/kg is equivalent to modeling dermal exposure to COPCs in soil. COPCs in fugitive dust could land on exposed skin surfaces and be absorbed through the skin. The concentrations of COPCs in surface soils collected inside the fence (n = 11) (Table 3-3) and Equation 3-7 were used to model dermal exposure by current remediation workers.

$$AD = \frac{FD \times CF \times SA \times AF \times ABS \times EF \times ED}{BW \times AT} \quad (3-7)$$

where: AD = absorbed dose (mg/kg-day);  
 FD = concentration of chemical in fugitive dusts (mg/m<sup>3</sup>);  
 CF = conversion factor (10<sup>-6</sup> kg/mg);  
 SA = skin surface area available for contact (cm<sup>2</sup>);  
 AF = soil-to-skin adherence factor (mg/cm<sup>2</sup>-event);  
 ABS = absorption factor (unitless);  
 EF = exposure frequency (events/yr);  
 ED = exposure duration (yr);  
 BW = body weight (kg);  
 AT = averaging time (days).

Parameters used to model intakes via dermal contact with contaminated soil are summarized in Table 3-7. Since facility-specific data on the adherence of facility soil to human skin were not available, USEPA (1992b) suggests using an adherence factor of 1.0 mg/cm<sup>2</sup> for the RME scenario and 0.2 for the average exposure scenario. Fiftieth percentile skin surface area values rather than 95th percentile values were used in conjunction with average body weights. These values were used because skin surface area and body weight are highly correlated and because 50th percentile values best characterize individuals of average body weight (USEPA, 1989a). Clothing prevents dermal contact with and subsequent absorption of contaminants when direct contact with soils is involved. The skin surface area values listed in Table 3-7 for incineration and security workers (2,020 cm<sup>2</sup>) is the median value for hands, neck, and head (USEPA, 1990a), since it is mandatory that all CWMCS employees wear long sleeves, long pants, shoes, safety glasses, and hard hats while outside. The 50th percentile skin surface area value of 1,180 cm<sup>2</sup> (USEPA, 1990a) was used for the remediation worker, since they wore gloves at all times when on-site. Exposure duration, averaging time, and body weight values for each receptor group are the same as those described for previous pathways.

Dermal exposure is evaluated in terms of absorbed (as opposed to administered) dose. Evaluation of the risks posed by dermal exposure to chemicals is complicated by several factors. First, most RfDs and cancer slope factors were developed from oral exposure data. This

disparity between site-related and benchmark exposure routes introduces uncertainty because the route by which chemicals enter the body can significantly impact the nature and intensity of toxic responses. Second, because chemicals must generally enter the body to exert any toxic effects (with the exception of compounds active at the point of contact), it is necessary to express exposure via the dermal route in terms of absorbed dose. However, as the majority of RfDs and cancer slope factors to which exposures are compared in the process of risk assessment are administered oral doses, these dose expressions are quantitatively incompatible. Failure to reconcile exposure units may result in an overestimation of dermal risk (i.e., administered doses are usually larger than absorbed doses). Third, the dermal exposure medium in this assessment is soil, while the most common experimental exposure media are water and diet. As a large body of field and laboratory data has demonstrated that soil adsorption generally reduces the bioavailability of chemicals (e.g., Calderbank, 1989; Calvet, 1989), failure to account for medium effects may tend to overestimate risk (i.e., absorbed dose will be overestimated).

An accepted method for addressing the latter two difficulties (incompatible dose units and differential bioavailability) is substitution of a chemical-specific or chemical group-specific dermal relative absorption factor (RAF) for the factor ABS in the dermal exposure equation. The dermal RAF is defined as the ratio of the fraction of soil-associated chemical that is likely to be absorbed through the skin to the fractional absorption of the same chemical as administered in these studies used to establish reference dose and/or cancer slope factor (USEPA, 1989a, 1991b). In the absence of data on the dermal absorption from soil of most chemicals, a reasonable approach is to group chemicals according to the following classification scheme and default dermal RAFs recommended by EPA Region I (1989b):

Volatile organic compounds	50%
Semi-volatile organics, including PAHs	5%
Inorganic compounds	negligible



An ABS value of 1% was used for metals, which is the maximum value for metals reported by Ryan *et al.* (1986). Sheehan *et al.* (1991) reported that assuming that 1 percent of chromium would penetrate the skin surface represented the "upper-bound of the plausible extraction percentage (dermal bioavailability due to matrix effects)." An ABS value of 0.5 was used for 1,1-dichloroethylene and methylene chloride, and an ABS value of 0.05 was used for all other organic COPCs.

### 3.4.2 Modeling Exposures via Inhalation

Exposure from inhalation of chemicals sorbed to resuspended dust was calculated as a function of the concentration of contaminants in air, respiration rate, and body weight as follows:

$$I = \frac{CA \times IR \times ET \times EF \times ED}{BW \times AT} \quad (3-8)$$

Where: I = intake from inhaling contaminated particulates (mg/kg/day);  
CA = model-predicted concentration of COPCs in air (mg/m<sup>3</sup>);  
RR = respiration rate (m<sup>3</sup>/hour);  
ET = exposure time (hours/day);  
EF = exposure frequency (days/year);  
ED = exposure duration (years);  
AT = averaging time (days);  
BW = body weight (kg).

Parameters used to model intakes via inhalation and estimated air concentration data are listed in Tables 3-8 and 3-5, respectively. Although an exposure time of eight hours a day is recommended for workers, CWMCS reported that on-site incineration, impoundment remediation, and security workers spend eight, 10, and eight hours a day outdoors on-site, respectively. The upper-bound respiration rate of 20 m<sup>3</sup> per workday (2.5 m<sup>3</sup>/hr assuming an 8-hour workday) was used to model intakes by all receptors (USEPA, 1991a). Values for exposure frequency, exposure duration, averaging time, and body weight are the same as those described for previous pathways.

### **3.4.3 Modeling Exposures by the Hypothetical Future Worker**

Future land use calculations are keyed to hypothetical on-site workers who may be exposed to facility-related COPCs. Two different receptor groups were evaluated for two different exposure periods. Future workers were assumed to be individuals who work in and around the incineration complex. Two different exposure scenarios were evaluated for the future receptor group. For the average case, future receptors were assumed to be exposed to facility-related contaminants two hours a day, five days a week, 50 weeks a year for eight years. Parameters used to model intakes by future receptors using site-specific exposure data are summarized in Tables 3-10, 3-11, and 3-13. For the RME scenario, hypothetical future workers were assumed to be exposed eight hours a day, five days a week, 50 weeks a year, for 25 years (USEPA, 1991a). Parameters used to model intakes by hypothetical future receptors using standard default exposure assumptions are summarized in Tables 3-9, 3-12, and 3-14.

**TABLE 3-1**  
**POTENTIAL EXPOSURE PATHWAYS EVALUATED**  
**FOR CURRENT AND FUTURE RECEPTORS**

Pathway <sup>a</sup>	Current Receptors	Rationale
<b>Surface Soil</b>		
Dermal Absorption	Yes	COPCs present in surface soil could be absorbed through the skin.
Ingestion	Yes	Incidental ingestion of surface soil is possible.
<b>Air</b>		
Inhalation (Vapors)	Yes <sup>b</sup>	Organic COPCs may volatilize from surface soils, subsurface fill, and shallow groundwater.
Inhalation (Particulates)	Yes	Resuspension of particulates via wind erosion is possible.
<b>Subsurface Materials</b>		
Inhalation	Yes <sup>b</sup>	Organic COPCs may volatilize from surface soils, subsurface fill, and shallow groundwater.
Ingestion	No	Although contact with subsurface materials is possible, these exposure are infrequent and of short duration.
Dermal Contact	No	Although contact with subsurface materials is possible, these exposure are infrequent and of short duration.
<b>Food</b>		
Ingestion of Fish	Yes	Although individuals could catch and eat fish from Lake Calumet, this pathway is not expected to contribute substantially to human exposure (see Section 3.1.3 for a more detailed explanation).
<b>Surface Water</b>		
Dermal Contact While Swimming	No	Individuals do not swim or wade frequently in Lake Calumet.
Ingestion While Swimming	No	Individuals do not swim or wade frequently in Lake Calumet.
Dermal Contact With Sediment While Swimming	No	Individuals do not swim or wade frequently in Lake Calumet.
<b>Groundwater</b>		
Ingestion	No	Workers and residents consume water from a municipal source.
Inhalation of Organic Vapors While Showering	No	Workers and residents use water from a municipal source for washing.
Dermal Absorption While Washing	No	Workers and residents use water from a municipal source for washing.

<sup>a</sup> Applies to both on-site workers and off-site residential receptors.

<sup>b</sup> Site specific monitoring data have yet to be collected; evaluation risks for the inhalation of organic vapors will be characterized following collection and validation of facility-specific monitoring data.

**TABLE 3-2**  
**RESULTS OF THE KOLMOGOROV-SMIRNOV GOODNESS OF FIT TEST PERFORMED FOR METALS**  
**AND ORGANIC CHEMICALS OF POTENTIAL CONCERN IN FACILITY SURFACE SOILS**

Chemical	Sample Size	Distribution <sup>a,f</sup>	Significance Level <sup>b</sup>	Mean (μg/kg) <sup>c</sup>	Standard Deviation (μg/kg) <sup>d</sup>	H or t Statistic <sup>e</sup>	95% Upper Confidence Limit for the Distribution (μg/kg)	Maximum Measured Value (μg/kg)
<b>METALS</b>								
Antimony	20	none (assumed normal)	0.002	12,307	19,617	1.729	19,894	90,000
Beryllium	20	normal	0.493	1357	708	1.729	1630	3400
Cadmium	20	lognormal	0.354	5405	2.75	2.612	16,527	55,700
Chromium	20	lognormal	0.055	170,076	4.76	3.460	1,975,241	1,320,000
Copper	20	normal	0.814	42,450	15,926	1.729	48,607	78,000
Lead	20	lognormal	0.610	89,054	2.83	2.655	288,498	1,260,000
Mercury	20	lognormal	0.081	136	2.00	2.210	247	540
Selenium	20	lognormal	0.181	656	1.80	2.100	1029	1600
Silver	20	none (assumed lognormal)	0.007	1274	2.10	2.260	2464	3700
Zinc	20	lognormal	0.150	164,720	2.50	2.500	435,220	1,570,000
<b>ORGANICS</b>								
Benz(a)anthracene	20	lognormal	0.299	1398	3.30	2.870	6194	6000
Benzo(a)pyrene	20	normal	0.200	1198	807	1.729	1510	2760
Benzo(b)fluoranthene	20	normal	0.431	2394	4862	1.729	3113	7550
Benzo(k)fluoranthene	20	none (assumed lognormal)	0	758	3.00	2.740	2774	2320
Chrysene	20	normal	0.329	1699	1447	1.729	2257	5770

**TABLE 3-2**  
**RESULTS OF THE KOLMOGOROV-SMIRNOV GOODNESS OF FIT TEST PERFORMED FOR METALS**  
**AND ORGANIC CHEMICALS OF POTENTIAL CONCERN IN FACILITY SURFACE SOILS**  
**- Continued -**

Chemical	Sample Size	Distribution <sup>a,c</sup>	Significance Level <sup>b</sup>	Mean (μg/kg) <sup>c</sup>	Standard Deviation (μg/kg) <sup>d</sup>	H or t Statistic <sup>c</sup>	95% Upper Confidence Limit for the Distribution (μg/kg)	Maximum Measured Value (μg/kg)
1,1-Dichloroethylene	19 <sup>a</sup>	none (assumed normal)	0	3.3	4.6	1.729	5.15	18.5
Fluoranthene	20	lognormal	1.000	1544	3.40	2.900	7148	9380
Hexachlorobenzene	20	none (assumed lognormal)	0	425	3.60	3.010	2323	3100
Indeno(1,2,3-cd)pyrene	20	none (assumed lognormal)	0	952	3.2	2.850	4070	3250
Methylene chloride	20	none (assumed normal)	0	2.4	2.1	1.729	3.2	11.0
Phenanthrene	20	lognormal	0.596	1469	4.1	3.200	10,919	19,105
Pyrene	20	lognormal	0.132	1469	3.25	2.860	6354	7750

<sup>a</sup> Sample size was 20 (all surface soil samples from the facility) unless otherwise noted.

<sup>b</sup> The data were assumed to fit the distribution if the results of the K-S test are significant at the 95% level of confidence. A significance level greater than 0.05 indicates that the data set fits the distribution specified in Column 3. Conversely, a significance level of less than 0.05 indicates that no relationship can be drawn from the data set.

<sup>c</sup> Arithmetic means are reported for chemicals shown to be normally distributed, while the geometric mean is reported for chemicals shown to be lognormally distributed.

- <sup>d</sup> Arithmetic standard deviations are reported for chemicals shown to be normally distributed, while the arithmetic standard deviation of the log-transformed data is reported for chemicals shown to be lognormally distributed.
- <sup>e</sup> The H statistic and Equation 3-2 were used to calculate upper confidence limits (UCLs) for chemicals with a lognormal distribution, while the t statistic and Equation 3-1 were used to calculate UCL values for chemicals with a normal distribution.
- <sup>f</sup> Chemical whose data did not fit any distribution (i.e., those labeled "none") were assumed to fit the distribution (i.e., normal or lognormal) that yielded the higher UCL value.
- <sup>g</sup> Sample size equals 19, since one sample was deemed unreliable in the data validation process.

**TABLE 3-3**  
**EXPOSURE POINT CONCENTRATIONS FOR SURFACE SOIL USED TO MODEL EXPOSURES FOR ALL CURRENT WORKERS<sup>a</sup>**

Chemical	Sample Size <sup>a</sup>	Distribution <sup>a,c</sup>	Range (µg/kg)	Mean <sup>b</sup> (µg/kg)	Standard Deviation <sup>c</sup> (µg/kg)	95% Upper Confidence Limit (µg/kg)	Maximum Measured Value (mg/kg)	Exposure-Point Concentration Used to Model Intakes <sup>d</sup> (µg/kg)
<b>METALS</b>								
Antimony	11	none (assumed lognormal)	3400 - 23,000	6816	0.91	23,342	23,000	23,000
Beryllium	11	normal	270 - 3400	1421	827	1873	3400	1873
Cadmium	11	lognormal	540 - 55,700	6960	1.25	60,835	55,700	55,700
Chromium (total)	11	normal	8900 - 1,320,000	625,991	479,490	887,955	1,320,000	887,955
Copper	11	normal	15,000 - 78,000	39,273	17,106	48,618	78,000	48,618
Lead	11	lognormal	11,000 - 120,000	49,021	0.66	100,689	120,000	100,689
Mercury	11	normal	46 - 250	106.4	60.8	139.6	250	139.6
Selenium	11	lognormal	295 - 1600	752	0.63	1468	1600	1468
Silver	11	normal	600 - 3700	2273	1271	2967	3700	2967
Zinc	11	lognormal	40,000 - 251,000	97,247	0.52	160,473	251,000	160,473
<b>ORGANICS</b>								
Benzo(a)anthracene	11	lognormal	195 - 4650	615	0.96	2357	4650	2357
Benzo(a)pyrene	11	lognormal	140 - 1500	414	0.98	1670	1500	1500
Benzo(b)fluoranthene	11	lognormal	251 - 2940	740	0.98	3017	2940	2940
Benzo(k)fluoranthene	11	lognormal	140 - 1500	365	0.99	1516	1500	1500
Chrysene	11	lognormal	170 - 1730	552	0.83	1586	1730	1586
1,1-Dichloroethylene	11	none (assumed lognormal)	1.6 - 18.5	2.5	0.92	8.9	18.5	8.9
Fluoranthene	11	lognormal	150 - 2910	701	0.94	2568	2910	2568

**TABLE 3-3**  
**EXPOSURE-POINT CONCENTRATIONS FOR SURFACE SOIL USED TO MODEL EXPOSURES BY ALL CURRENT WORKERS**  
 - Continued -

Chemical	Sample Size <sup>a</sup>	Distribution <sup>a,c</sup>	Range (µg/kg)	Mean <sup>b</sup> (µg/kg)	Standard Deviation <sup>c</sup> (µg/kg)	95% Upper Confidence Limit (µg/kg)	Maximum Measured Value (mg/kg)	Exposure-Point Concentration Used to Model Intakes <sup>d</sup> (µg/kg)
Hexachlorobenzene	11	none (assumed lognormal)	ND - 1150	188	0.93	665	1150	665
Indeno(1,2,3-cd)pyrene	11	none (assumed lognormal)	210 - 2200	413	0.95	1542	2200	1542
Methylene chloride	11	none (assumed normal)	1.6 - 11	2.5	2.8	4.1	11	4.1
Phenanthrene	11	lognormal	124 - 19,105	669	1.4	10,212	19,105	10,212
Pyrene	11	lognormal	132 - 2480	696	1.0	3116	2480	2480

<sup>a</sup> Soil samples collected from inside the fence only [i.e., samples SS-1 through SS-5, SS-14 through SS-17, and SS-20 and SS-21; n = 11). Non-detect values were assumed to be equal to one-half the sample quantitation limit.

<sup>b</sup> Arithmetic means are reported for chemicals shown to be normally distributed, while the geometric mean is reported for chemicals shown to be lognormally distributed.

<sup>c</sup> Arithmetic standard deviations are reported for chemicals shown to be normally distributed, while the arithmetic standard deviation of the log-transformed data is reported for chemicals shown to be lognormally distributed.

<sup>d</sup> The maximum value was used as the exposure-point concentration if the calculated 95% upper confidence limit exceeded the maximum value.

<sup>e</sup> Chemical whose data did not fit any distribution (i.e., those labeled "none") were assumed to fit the distribution (normal or lognormal) that yielded the higher UCL value.



**TABLE 3-4**  
**EXPOSURE POINT CONCENTRATIONS FOR SURFACE SOIL USED TO MODEL EXPOSURES BY ALL FUTURE RECEPTORS\***

Chemical	Sample Size <sup>a</sup>	Distribution <sup>a,c</sup>	Range (µg/kg)	Mean <sup>b</sup> (µg/kg)	Standard Deviation <sup>c</sup> (µg/kg)	95% Upper Confidence Limit (µg/kg)	Maximum Measured Value (mg/kg)	Exposure-Point Concentration Used to Model Intakes <sup>d</sup> (µg/kg)
<b>METALS</b>								
Antimony	20	none (assumed normal)	3400 - 90,000	12,307	19,617	19,892	90,000	19,892
Beryllium	20	normal	270 - 3400	1357	708	1630	3400	1630
Cadmium	20	lognormal	540 - 55,700	5405	1.0	16,527	55,700	16,527
Chromium (total)	20	lognormal	8900 - 1,320,000	170,076	1.6	1,977,241	1,320,000	1,320,000
Copper	20	normal	15,000 - 78,000	42,450	15,926	48,607	78,000	48,607
Lead	20	lognormal	11,000 - 1,206,000	89,054	1.0	288,498	1,260,000	288,498
Mercury	20	lognormal	46 - 540	135.6	0.7	246.8	540	246.8
Selenium	20	lognormal	295 - 1600	644	0.6	1029	1600	1029
Silver	20	none (assumed lognormal)	600 - 3700	1274	0.7	2464	3700	2464
Zinc	20	lognormal	40,000 - 1,570,000	164,720	0.9	435,220	1,570,000	435,220
<b>ORGANICS</b>								
Benzo(a)anthracene	20	lognormal	195 - 6000	1398	1.2	6194	6000	6000
Benzo(a)pyrene	20	normal	140 - 2760	1198	807	1510	2760	1510
Benzo(b)fluoranthene	20	normal	251 - 7550	2394	1862	3113	7550	3113
Benzo(k)fluoranthene	20	none (assumed lognormal)	140 - 2230	758	1.1	2773	2230	2230
Chrysene	20	normal	170 - 5770	1699	1447	2258	5770	2258
1,1-Dichloroethylene	19	none (assumed normal)	1.7 - 18.5	3.5	4.7	5.35	18.5	5.35

**TABLE 3-4**  
**EXPOSURE POINT CONCENTRATIONS FOR SURFACE SOIL USED TO MODEL EXPOSURES BY ALL FUTURE WORKERS<sup>a</sup>**  
**- Continued -**

Chemical	Sample Size <sup>a</sup>	Distribution <sup>b,c</sup>	Range (µg/kg)	Mean <sup>b</sup> (µg/kg)	Standard Deviation <sup>c</sup> (µg/kg)	95% Upper Confidence Limit (µg/kg)	Maximum Measured Value (mg/kg)	Exposure-Point Concentration Used to Model Intakes <sup>d</sup> (µg/kg)
Fluoranthene	20	lognormal	150 - 9380	1544	1.2	7148	9380	7148
Hexachlorobenzene	20	none (assumed lognormal)	110 - 3100	425	1.3	2323	3100	2323
Indeno(1,2,3-cd)pyrene	20	none (assumed lognormal)	210 - 3250	952	1.2	4070	3250	3250
Methylene chloride	20	none (assumed normal)	1.6 - 11	2.385	2.1	3.2	11	3.2
Phenanthrene	20	lognormal	124 - 19,105	1469	1.4	10,919	19,105	10,919
Pyrene	20	lognormal	132 - 7750	1466	1.2	6341	7750	6341

<sup>a</sup> Soil samples collected from the entire facility [i.e., samples from both inside and outside the fence were used (Samples SS-1 through SS-10 and SS-15 through SS-23; n = 20)]. Non-detect values were assumed to be equal to one-half the sample quantitation limit.

<sup>b</sup> Arithmetic means are reported for chemicals shown to be normally distributed, while the geometric mean is reported for chemicals shown to be lognormally distributed.

<sup>c</sup> Arithmetic standard deviations are reported for chemicals shown to be normally distributed, while the arithmetic standard deviation of the log-transformed data is reported for chemicals shown to be lognormally distributed.

<sup>d</sup> The maximum value was used as the exposure-point concentration if the calculated 95% upper confidence limit exceeded the maximum value.

<sup>e</sup> Chemical whose data did not fit any distribution (i.e., those labeled "none") were assumed to fit the distribution (normal or lognormal) that yielded the higher UCL value.

**TABLE 3-5**  
**PREDICTED CONCENTRATION OF CHEMICALS OF POTENTIAL CONCERN**  
**IN AIR AS PARTICULATES**

Chemical of Concern	Mean Measured Concentration in Surface Soils Facility Wide (mg/kg) <sup>a</sup>	Average Estimated Concentration in Air as Particulates (mg/m <sup>3</sup> ) <sup>b</sup>	Upper-Bound or Maximum Measured Concentration in Surface Soils Facility Wide (mg/kg) <sup>c</sup>	Upper-Bound Estimated Concentration in Air as Particulates (mg/m <sup>3</sup> ) <sup>b</sup>
<b>METALS</b>				
Antimony	12.31	1.8x10 <sup>8</sup>	19.89	2.9x10 <sup>8</sup>
Beryllium	1.36	2.0x10 <sup>9</sup>	1.63	2.4x10 <sup>9</sup>
Cadmium	5.41	7.9x10 <sup>9</sup>	16.53	2.4x10 <sup>8</sup>
Chromium (total)	170.1	2.5x10 <sup>7</sup>	1320	1.9x10 <sup>6</sup>
Copper	42.45	6.2x10 <sup>8</sup>	48.61	7.1x10 <sup>8</sup>
Lead	89.05	1.3x10 <sup>7</sup>	288.5	4.2x10 <sup>7</sup>
Mercury	0.136	2.0x10 <sup>-10</sup>	0.25	3.7x10 <sup>-10</sup>
Selenium	0.64	9.4x10 <sup>-10</sup>	1.03	1.5x10 <sup>9</sup>
Silver	1.27	1.9x10 <sup>9</sup>	2.46	3.6x10 <sup>9</sup>
Zinc	164.7	2.4x10 <sup>7</sup>	435.2	6.4x10 <sup>7</sup>
<b>ORGANICS</b>				
Benzo(a)anthracene	1.4	2.0x10 <sup>9</sup>	6.0	8.8x10 <sup>9</sup>
Benzo(a)pyrene	1.2	1.8x10 <sup>9</sup>	1.51	2.2x10 <sup>9</sup>
Benzo(b)fluoranthene	2.39	3.5x10 <sup>9</sup>	3.11	4.6x10 <sup>9</sup>
Benzo(k)fluoranthene	0.76	1.1x10 <sup>9</sup>	2.23	3.3x10 <sup>9</sup>
Chrysene	1.7	2.5x10 <sup>9</sup>	2.26	3.3x10 <sup>9</sup>
1,1-Dichloroethylene	0.0035	5.1x10 <sup>-12</sup>	0.0054	7.9x10 <sup>-12</sup>
Fluoranthene	1.54	2.3x10 <sup>9</sup>	7.15	1.0x10 <sup>8</sup>
Hexachlorobenzene	0.425	6.2x10 <sup>-10</sup>	2.32	3.4x10 <sup>9</sup>
Indeno(1,2,3-cd)pyrene	0.95	1.4x10 <sup>9</sup>	3.25	4.8x10 <sup>9</sup>
Methylene chloride	0.0024	3.5x10 <sup>-12</sup>	0.0033	4.8x10 <sup>-12</sup>
Phenanthrene	1.47	2.2x10 <sup>9</sup>	10.92	1.6x10 <sup>8</sup>
Pyrene	1.47	2.2x10 <sup>9</sup>	6.34	9.3x10 <sup>9</sup>

<sup>a</sup> The arithmetic mean was used if the data were normally distributed. The geometric mean was used for lognormally distributed data (see Table 3-2). Based on all surface soil samples collected facility-wide (n = 20).

<sup>b</sup> Calculated using Equations 3-3 and 3-4 from USEPA (1991b).

<sup>c</sup> The 95 percent upper confidence limit or the maximum measured value was used, whichever was lower.

**TABLE 3-6**  
**PARAMETERS USED TO MODEL EXPOSURES FROM INCIDENTAL**  
**INGESTION OF SOIL BY CURRENT RECEPTORS**

Parameter	Receptor Group	RME Value and Average Values Used <sup>a</sup>	Reference
Ingestion Rate (IR)	All Workers	50 mg/day	USEPA, 1991a
Fraction ingestion from the contaminated area (FI)	Incineration Workers	0.25 <sup>b</sup>	Facility-specific data
	Remediation Workers	1.5 <sup>c</sup>	
	Security Personnel	0.13 <sup>d</sup>	
Exposure Frequency (EF)	Remediation Worker	300 days/year (6 days/week)	Facility-specific data  USEPA, 1991a
	All Other Workers	250 days/year	
Exposure Duration (ED)	Remediation Worker	1 year	Facility-specific data
	All Other Workers	8 years (RME) 3 years (average)	
Body Weight (BW)	All Workers	70 kg	USEPA, 1991a
Averaging Time (AT)	Remediation Worker	365 days - non-carcinogens	USEPA, 1989a
	All Other Workers	2920 days - non-carcinogens (RME) 1095 days - non-carcinogens (average)	
	All Workers	25,550 days (carcinogens)	

<sup>a</sup> If a specific average value is not listed, the RME value was used.

<sup>b</sup> (2 hr/day \* 250 days/year) / 2000 (total number of working hours per year). Assumes that workers are not exposed to facility-related contaminant while on paved areas or when not working at the CWMCS facility. The FI value represents the length of time individuals spend on-site. Since a time-weighted FI value of 1.0 indicates that individuals work the default eight-hour day, the 0.25 value indicates that remediation workers were on-site less than the standard eight-hour workday.

<sup>c</sup> (10 hr/day \* 300 days/year) / 2000 (total number of working hours per year). Assumes that workers are not exposed to facility-related contaminants while on paved areas or when not working at the CWMCS facility. The FI value represents the length of time individuals spend on-site. Since a time-weighted FI value of 1.0 indicates that individuals work the default eight-hour day, the 1.5 value indicates that remediation workers were on-site more than the standard eight-hour workday.

<sup>d</sup> (1 hr/day \* 250 days/year) / 2000 (total number of working hours per year). Assumes that workers are not exposed to facility-related contaminant while on paved areas or when not working at the CWMCS facility. The FI value represents the length of time individuals spend on-site. Since a time-weighted

**FI value of 1.0 indicates that individuals work the default eight-hour day, the 0.13 value indicates that remediation workers were on-site less than the standard eight-hour workday.**

**TABLE 3-7**  
**PARAMETERS USED TO MODEL EXPOSURES**  
**FROM DERMAL CONTACT WITH SOIL BY CURRENT RECEPTORS<sup>a</sup>**

Parameter	Receptor Group	RME and Average Values Used <sup>b</sup>	Reference
Skin Surface Area (SA)	Remediation Workers	1180 cm <sup>2</sup>	USEPA, 1990a
	Security and Incineration Workers	2020 cm <sup>2</sup>	
Adherence Factor (AF)	All Workers	1.0 mg/cm <sup>2</sup> (RME) 0.2 mg/cm <sup>2</sup> (Average)	USEPA, 1992b
Absorption Factors (ABS)	All Workers	Volatile organics = 50% (0.5) Semi-volatile organics = 5% (0.05) Metals = 1% (0.01) <sup>c</sup>	USEPA, 1991a
Exposure Frequency (EF)	Remediation Worker	300 days/year (6 days/week)	Facility-specific data
	All Other Workers	250 days/year	USEPA, 1991a
Exposure Duration (ED)	Remediation Worker	1 year	Facility-specific data
	All Other Workers	8 years (RME) 3 years (average)	
Body Weight (BW)	All Workers	70 kg	USEPA, 1991a
Averaging Time (AT)	Remediation Worker	365 days - non-carcinogens	USEPA, 1989a
	All Other Workers	2920 days - non-carcinogens (RME) 1095 days - non-carcinogens (average)	
	All Workers	25,550 days (carcinogens)	

<sup>a</sup> For operations and security personnel, the concentration of COPCs in fugitive dusts and Equation 3-6 were used. For the remediation worker, the concentrations of COPCs in surface soils and Equation 3-7 were used.

<sup>b</sup> If a specific average value is not listed, the RME value was used.

<sup>c</sup> See Section 3.4.1.2 for an explanation of these values.

**TABLE 3-8**  
**PARAMETERS USED TO MODEL INHALATION EXPOSURES**  
**BY CURRENT RECEPTORS**

Parameter	Receptor Group	RME and Average Values Used <sup>a</sup>	Reference
Respiration Rate (RR)	All Workers	2.5 m <sup>3</sup> /hour	USEPA, 1991a
Exposure Time (ET)	Remediation Worker	10 hours/day	Facility-specific data
	Security Worker	8 hours/day	
	Incineration Worker	8 hours/day	
Exposure Frequency (EF)	Remediation Worker	300 days/year (6 days/week)	Facility-specific data
	All Other Workers	250 days/year	USEPA, 1991a
Exposure Duration (ED)	Remediation Worker	1 year	Facility-specific data
	All Other Workers	8 years (RME) 3 years (average)	
Body Weight (BW)	All Workers	70 kg	USEPA, 1989a
Averaging Time (AT)	Remediation Worker	365 days - non-carcinogens	USEPA, 1989a
	All Other Workers	2920 days - non-carcinogens (RME) 1095 days - non-carcinogens (average)	
	All Workers	25,550 days - carcinogens	

<sup>a</sup> If a specific average value is not listed, the RME value was used.

**TABLE 3-9**  
**PARAMETERS USED TO MODEL EXPOSURES**  
**FROM INCIDENTAL INGESTION OF SOIL BY HYPOTHETICAL FUTURE WORKERS**  
**USING STANDARD DEFAULT EXPOSURE ASSUMPTIONS**

Parameter	RME and Average Values Used <sup>a</sup>	Reference
Ingestion Rate (IR)	50 mg/day	USEPA, 1991a
Fraction ingestion from the contaminated area (FI)	1.0	USEPA, 1991a
Exposure Frequency (EF)	250 days/year	USEPA, 1991a
Exposure Duration (ED)	25 years	USEPA, 1991a
Body Weight (BW)	70 kg	USEPA, 1991a
Averaging Time (AT)	9125 days - noncarcinogens 25,550 days - carcinogens	USEPA, 1989a

<sup>a</sup> If a specific average value is not listed, the RME value was used.



**TABLE 3-10**  
**PARAMETERS USED TO MODEL EXPOSURES FROM INCIDENTAL INGESTION**  
**OF SOIL BY FUTURE WORKERS USING SITE-SPECIFIC EXPOSURE DATA**

Parameter	RME and Average Values Used <sup>a</sup>	Reference
Ingestion Rate (IR)	50 mg/day	USEPA, 1991a
Fraction ingestion from the contaminated area (FI)	0.25 <sup>b</sup>	Facility-specific data
Exposure Frequency (EF)	250 days/year	USEPA, 1991a
Exposure Duration (ED)	8 years (RME) 3 years (average)	Facility-specific data
Body Weight (BW)	70 kg	USEPA, 1991a
Averaging Time (AT)	2920 days - non-carcinogens (RME) 1095 days - non-carcinogens (average)  25,550 days - carcinogens	USEPA, 1989a

<sup>a</sup> If a specific average value is not listed, the RME value was used.

<sup>b</sup> (2 hr/day \* 250 days/year) / 2000 (total number of working hours per year). Assumes that workers are not exposed to facility-related contaminants while on paved areas or when not working at the CWMCS facility.

**TABLE 3-11**  
**PARAMETERS USED TO MODEL EXPOSURES FROM DERMAL CONTACT**  
**WITH SOIL BY HYPOTHETICAL FUTURE WORKERS**  
**USING STANDARD DEFAULT EXPOSURE ASSUMPTIONS**

Parameter	RME and Average Values Used <sup>a</sup>	Reference
Skin Surface Area (SA)	2020 cm <sup>2</sup>	USEPA, 1990a
Adherence Factor (AF)	1.0 mg/cm <sup>2</sup> (RME) 0.2 mg/cm <sup>2</sup> (Average)	USEPA, 1992b
Absorption Factors (ABS)	See text for chemical-specific values.	USEPA, 1989b
Exposure Frequency (EF)	250 days/year	USEPA, 1991a
Exposure Duration (ED)	25 years	USEPA, 1991a
Body Weight (BW)	70 kg	USEPA, 1991a
Averaging Time (AT)	9125 days - non-carcinogens 25,550 days - carcinogens	USEPA, 1989a

<sup>a</sup> If a specific average value is not listed, the RME value was used.

**TABLE 3-12**  
**PARAMETERS USED TO MODEL EXPOSURES FROM DERMAL CONTACT**  
**WITH SOIL BY FUTURE WORKERS**  
**USING SITE-SPECIFIC EXPOSURE DATA**

Parameter	RME and Average Values Used <sup>a</sup>	Reference
Skin Surface Area (SA)	2020 cm <sup>2</sup>	USEPA, 1990a
Adherence Factor (AF)	1.0 mg/cm <sup>2</sup> (RME) 0.2 mg/cm <sup>2</sup> (Average)	USEPA, 1992b
Absorption Factors (ABS)	See text for chemical-specific values.	USEPA, 1989b
Exposure Frequency (EF)	250 days/year	USEPA, 1991a
Exposure Duration (ED)	8 years (RME) 3 years (average)	Facility-specific data
Body Weight (BW)	70 kg	USEPA, 1991a
Averaging Time (AT)	2920 days - non-carcinogens (RME) 1095 days - non-carcinogens (average)  25,550 days - carcinogens	USEPA, 1989a

<sup>a</sup> If a specific average value is not listed, the RME value was used.

**TABLE 3-13**  
**PARAMETERS USED TO MODEL INHALATION EXPOSURES**  
**BY HYPOTHETICAL FUTURE WORKERS**  
**USING STANDARD DEFAULT EXPOSURE ASSUMPTIONS**

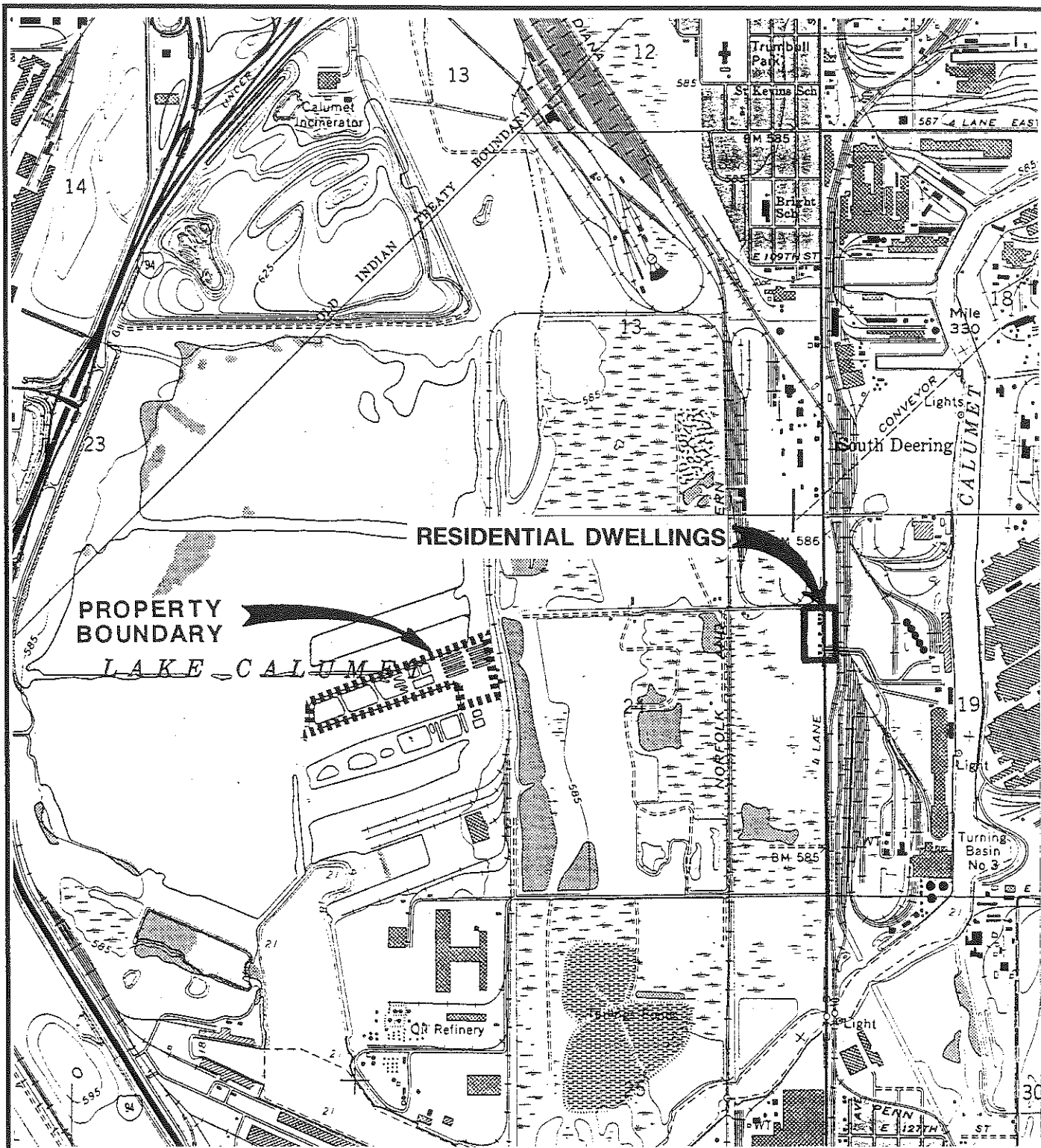
Parameter	RME and Average Values Used <sup>a</sup>	Reference
Respiration Rate (RR)	2.5 m <sup>3</sup> /hour (assumes an 8-hr workday)	USEPA, 1991a
Exposure Time (ET)	8 hours/day	USEPA, 1991a
Exposure Frequency (EF)	250 days/year	USEPA, 1991a
Exposure Duration (ED)	25 years	USEPA, 1991a
Body Weight (BW)	70 kg	USEPA, 1989a
Averaging Time (AT)	9125 days - non-carcinogens 25,550 days - carcinogens	USEPA, 1989a

<sup>a</sup> If a specific average value is not listed, the RME value was used.

**TABLE 3-14**  
**PARAMETERS USED TO MODEL INHALATION EXPOSURES BY FUTURE WORKERS**  
**USING FACILITY-SPECIFIC EXPOSURE DATA**

Parameter	RME and Average Values Used <sup>a</sup>	Reference
Respiration Rate (RR)	2.5 m <sup>3</sup> /hour (assuming an 8-hour workday)	USEPA, 1991a
Exposure Time (ET)	8 hours/day	Facility-specific data
Exposure Frequency (EF)	250 days/year	USEPA, 1991a
Exposure Duration (ED)	8 years (RME) 3 years (average)	Facility-specific data
Body Weight (BW)	70 kg	USEPA, 1989a
Averaging Time (AT)	2090 days - non-carcinogens (RME) 1095 days - non-carcinogens (average)  25,550 days - carcinogens	USEPA, 1989a

<sup>a</sup> If a specific average value is not listed, the RME value was used.



BASE MAP SOURCE: USGS 7.5 MINUTE TOPOGRAPHIC QUADRANGLE, LAKE CALUMET, ILLINOIS-INDIANA, DATED 1965, PHOTOREVISED 1973, PHOTOINSPECTED 1977.

CWM CHEMICAL SERVICES, INC.  
CHICAGO INCINERATOR

FIGURE 3-1 FEB. 23 1995  
NEAREST RESIDENTIAL DWELLINGS

NORTH  
SCALE: 1"=2000'

DRN. BY SLH

PROJ. NO. 13963-055

DATE NOV. 1993

DAMES & MOORE

## 4.0 TOXICITY ASSESSMENT

Toxicity assessment evaluates the nature and extent of health effects from exposure to facility-related chemicals. The assessment consists of a hazard evaluation and a dose-response assessment. The hazard evaluation involves a comprehensive review of toxicity data to identify the severity of toxic properties associated with the COPCs. Once the potential toxicity of a chemical has been established, the next step is to determine the amount of chemical exposure that may result in adverse human health effects (i.e., to establish the dose-response relationship for each COPC). Thus, the toxicity assessment evaluates the increased likelihood of adverse health effects as a result of human exposure to facility-related chemicals.

COPCs were classified into two broad groups based on their mechanism of toxicity: carcinogens and non-carcinogens. These classifications have been selected because certain chemicals can have both properties, and health risks are calculated differently for carcinogenic and non-carcinogenic effects.

### 4.1 Non-Carcinogenic Health Effects

Potential effects from chronic exposure to non-carcinogenic compounds are assessed by comparing exposure levels to chronic oral reference doses (RfDs) and inhalation reference concentrations (RfCs). Unlike carcinogenic compounds, substances that cause systemic toxicity (i.e., toxic effects other than cancer) appear to do so through mechanisms that include a physiological threshold. Thus, a certain dose of compound must be present before toxic effects will be observed. RfDs represent the level of chemical intake that is not expected to produce adverse effects, even in sensitive subpopulations, over a lifetime of exposure. The approach used to estimate the likelihood that exposed individuals will experience non-carcinogenic effects assumes that there is some level of exposure (i.e., the RfD value) that individuals can tolerate without experiencing adverse health effects. Conversely, if exposure exceeds this threshold level, there may be some concern that exposed individuals will experience non-carcinogenic health effects.

RfDs are derived by dividing the "no observed adverse health effect level" (NOAEL) or the "lowest observed adverse health effect level" (LOAEL) obtained from human epidemiological or animal toxicological studies by a series of uncertainty factors. If the NOAEL is based on human data, a safety factor of 10 is usually applied to the NOAEL dose to account for variations in sensitivities between individual humans. If the NOAEL is based on animal data, an additional safety factor of 10 is applied to account for the differences between animals and humans. Additional safety factors can be applied on a case-by-case basis to account for interspecies and intra-individual differences. In general, RfDs represent an estimate of a chemical's potential toxicity with an uncertainty spanning one order of magnitude (USEPA, 1989a).

Potential health effects of chronic exposure to non-carcinogenic compounds were assessed by calculating a hazard quotient (HQ) for each chemical of concern. An HQ is derived by dividing the estimated daily intake by a chemical-specific RfD as shown in this equation:

$$\text{Hazard Quotient} = \frac{\text{Intake}}{\text{RfD}} \quad (4-1)$$

A HQ greater than one indicates that exposure to that contaminant may cause adverse health effects in exposed populations. It is important to note, however, that the level of concern associated with exposure to non-carcinogenic compounds does not increase linearly as HQs exceed one. In other words, HQ values do not represent a probability or a percentage. For example, a HQ value of 100 does not indicate that adverse health effects are 10 times more likely to occur than a HQ value of 10. All one can conclude is that HQ values greater than one indicate that non-carcinogenic health impacts are possible and that the more the HQ exceeds unity, the greater the concern about adverse health effects. Typically, chemical-specific HQs are summed to calculate pathway hazard index (HI) values, and pathway HI values are then summed to determine the total HI value for all exposure scenarios. This approach can result in the situation where HI values exceed unity even when no chemical-specific HQs exceed unity (i.e., adverse systemic health effects would be expected to occur only if the receptor were exposed to several contaminants simultaneously). In this situation, USEPA (1989a) recommends



segregating chemicals by similar effect on a target organ, and calculating separate HI values for each effect/target organ. If any of the separate HI values exceed unity, adverse, non-carcinogenic health effects are possible. In the absence of direct knowledge about the possible additive, synergistic, or antagonistic effects of simultaneous exposure to multiple compounds, simple additivity is typically assumed if similar target end-organs or mechanism of toxicity were in effect. If the mechanisms of toxicity and/or target organ effects are different, then hazard quotients are not aggregated. Table 4-1 lists the USEPA verified oral RfDs and inhalation RfCs that are available from USEPA for the COPCs.

## 4.2 Carcinogenic Risks

Potential carcinogenic effects are expressed as the probability that an individual may develop cancer during a lifetime from an exposure. This probability is based on projected intakes and chemical-specific dose-response data [i.e., cancer slope factors (CSFs)]. CSFs, and the estimated daily intake of a compound, averaged over a lifetime of exposure, are used to estimate the incremental risk that an individual exposed to that compound may develop cancer using this equation:

$$\text{Risk} = \text{Intake} \times \text{CSF} \quad (4-2)$$

CSFs are chemical-specific values based on carcinogenic dose-response data. Because CSFs represent the 95th percentile confidence limit on the probability of a carcinogenic response, risk estimates are upper-bound values. Thus, there is only a 5 percent probability that the actual risk is greater than the estimated risk, and a 95 percent chance that the true risk is lower than the projected risk. For carcinogenic compounds, it is assumed that a linear relationship exists between dose (exposure) and response. Thus, any exposure can theoretically lead to a carcinogenic response. Cancer risks from exposure to multiple carcinogens and multiple pathways are assumed to be additive (USEPA, 1989a). To obtain an estimate of total risk from all carcinogens at the facility, cancer risks were summed across all exposure pathways for potential carcinogens of concern. For carcinogenic effects, the total risk of all COPCs must fall

within or below the acceptable range of  $1 \times 10^{-4}$  to  $1 \times 10^{-6}$ . Although the  $1 \times 10^{-6}$  risk level is identified by USEPA (1989a) as a "point of departure" in evaluating risk assessment results, the revised National Contingency Plan clearly indicates that the  $1 \times 10^{-4}$  level is the upper bound of the acceptable range (USEPA, 1990c).

Evidence of chemical carcinogenicity originates primarily from two sources: (1) lifetime studies with laboratory animals, and (2) human (epidemiological) studies. For most chemical carcinogens, animal data from laboratory experiments represent the primary basis for the extrapolation. Major assumptions arise from the necessity of extrapolating experimental results (1) across species (from laboratory animals to humans), (2) from high-dose regions (to which laboratory animals are exposed) to low-dose regions (levels to which humans are likely to be exposed in the environment), and (3) across routes of administration (inhalation versus ingestion). Table 4-1 lists the oral and inhalation CSFs available for all COPCs except PAHs (see Section 4.2.1).

#### **4.2.1 Cancer Slope Factors for PAHs**

Currently, USEPA has not specified CSFs for PAHs other than BaP. In the past, risk assessors have assumed that all PAHs are equally as toxic as BaP. Recently, risk assessors have proposed using a toxicity equivalency factor (TEF) approach for determining the carcinogenicity of PAHs using BaP as the reference point. CSFs for PAHs of concern were derived using the TEF approach adopted by USEPA Region IX (IDEM, 1993) (Table 4-2). Table 4-2 shows CSFs derived for the PAHs of concern for the CWMCS facility. PAHs for which a CSF is not listed are classified as Class D carcinogens (i.e., not classifiable as human carcinogens) by USEPA and were evaluated qualitatively.

#### **4.3 Toxicity Profiles for the COPCs**

Table 4-3 present general and contaminant-specific information on health effects relating to the contaminants of concern evaluated in this risk assessment. Health effects described in these

tables may not necessarily be incurred by exposure to contaminant levels present at the CWMCS facility.

TABLE 4-1

## TOXICITY CONSTANTS FOR CHEMICALS OF POTENTIAL CONCERN IN CWMCS SURFACE SOIL

Chemical	Subchronic <sup>a</sup> /Chronic Oral Reference Dose (mg/kg-day)/ Target Effect/Organ	Uncertainty Factor	Subchronic <sup>a</sup> /Chronic Inhalation Reference Concentration (mg/kg-day)	Oral Cancer Slope Factor (mg/kg-day) <sup>-1</sup> [Unit Risk Value (μg/L)]	Inhalation Cancer Slope Factor (mg/kg-day) <sup>-1</sup>	Weight of Evidence <sup>a</sup>
<b>METALS</b>						
Antimony	4x10 <sup>-4</sup> <sup>H</sup> / 4x10 <sup>-4</sup> <sup>I</sup> blood, lifespan	1000	NA <sup>b</sup>	NA	NA	---
Beryllium	5x10 <sup>-3</sup> <sup>H</sup> / 5x10 <sup>-3</sup> <sup>I</sup> no significant adverse effects	100	NA	4.3 <sup>I</sup> [1.2x10 <sup>-4</sup> μg/L]	8.4 <sup>I,0</sup> [2.4x10 <sup>-3</sup> μg/m <sup>3</sup> ]	B2
Cadmium (food)	NA / 0.001 <sup>I</sup> kidney	10	NA	NA	6.3 <sup>I,0</sup> [1.8x10 <sup>-3</sup> μg/m <sup>3</sup> ]	B1
Chromium (III)	10 <sup>H</sup> / 1.0 <sup>I</sup> liver	1000	NA	NA	NA	---
Chromium (VI)	0.02 <sup>H</sup> / 0.005 <sup>I</sup>	500	NA	NA	41 <sup>I</sup> [1.2x10 <sup>-2</sup> μg/m <sup>3</sup> ]	A
Copper	0.037 <sup>H</sup> / 0.037 <sup>H</sup> gastrointestinal irritation	NA	NA	NA	NA	D
Lead	NA	NA	NA	NA	NA	B2
Mercury	3x10 <sup>-4</sup> <sup>H</sup> / 3x10 <sup>-4</sup> <sup>H</sup> neurotoxicity; kidney	1000	8.6x10 <sup>-5</sup> / 8.6x10 <sup>-5</sup> <sup>H</sup>	NA	NA	D
Selenium	0.005 <sup>H</sup> / 0.005 <sup>I</sup> dermatitis; hair loss	3	NA	NA	NA	D
Silver	5x10 <sup>-3</sup> <sup>H</sup> / 5x10 <sup>-3</sup> <sup>I</sup> argyria	3	NA	NA	NA	D
Zinc	0.3 <sup>H</sup> / 0.3 <sup>I</sup> anemia	3	NA	NA	NA	D

Chemical	Subchronic <sup>a</sup> /Chronic Oral Reference Dose (mg/kg-day)/ Target Effect/Organ	Uncertainty Factor	Subchronic/Chronic Inhalation Reference Concentration (mg/kg-day)	Oral Cancer Slope Factor (mg/kg-day) <sup>-1</sup> [Unit Risk Value (μg/L)]	Inhalation Cancer Slope Factor (mg/kg-day) <sup>-1</sup>	Weight of Evidence <sup>a</sup>
<b>ORGANICS</b>						
1,1-Dichloroethylene	9x10 <sup>-3</sup> <sup>H</sup> / 9x10 <sup>-3</sup> <sup>I</sup> kidney	1000	NA	0.6 <sup>I</sup> [1.5x10 <sup>-5</sup> μg/L]	0.175 <sup>I,°</sup> [5.0x10 <sup>-5</sup> μg/m <sup>3</sup> ]	C
Di-n-butyl phthalate	1.0 <sup>H</sup> / 0.1 <sup>I</sup> kidney, liver	1000	NA	NA	NA	D
Fluoranthene	0.4 <sup>H</sup> / 0.04 <sup>I</sup> liver, blood	100	NA	NA	NA	D
Hexachlorobenzene	8x10 <sup>-4</sup> <sup>H</sup> / 8x10 <sup>-4</sup> <sup>I</sup> liver, blood	100	NA	1.6 <sup>I</sup> [4.6x10 <sup>-5</sup> μg/L]	1.6 <sup>I,°</sup> [4.6x10 <sup>-4</sup> (μg/m <sup>3</sup> )]	B2
Methylene chloride	0.06 <sup>H</sup> / 0.06 <sup>I</sup> liver toxicity	100	0.86 <sup>H</sup> / 0.86 <sup>H</sup>	7.5x10 <sup>-3</sup> <sup>I</sup> [2.1x10 <sup>-7</sup> μg/L]	1.65x10 <sup>-3</sup> <sup>I,°</sup> [4.7x10 <sup>-7</sup> μg/m <sup>3</sup> ]	B2
Pyrene	0.3 <sup>H</sup> / 0.03 <sup>I</sup> kidney	3000	NA	NA	NA	D

<sup>a</sup> All subchronic oral references doses and inhalation reference concentrations are from *Health Effects Assessment Summary Tables* (USEPA, 1992; 1993b).

<sup>b</sup> A reference dose, reference concentration, or cancer slope factor is not available for that chemical (all NA values in table) in either IRIS OR HEAST.

<sup>H</sup> Source of toxicity constant is *Health Effects Assessment Summary Tables* (USEPA, 1992; 1993b).

<sup>I</sup> Source of toxicity constant is USEPA's IRIS on-line database (USEPA, 1993a).

<sup>°</sup> Inhalation cancer slope factors (CSFs) in (mg/kg-day)<sup>-1</sup> were derived from unit risk values using the equation:

$$\text{Inhalation CSF} = \text{Unit Concentration } [(\mu\text{g}/\text{m}^3)]^{-1} \times \frac{1}{(20 \text{ m}^3/\text{day}) (1/70 \text{ kg}) (\text{mg}/1000 \mu\text{g})}$$

Sources for unit risk values are the same as those listed for the inhalation cancer slope factors.

- \* Group A - Human Carcinogen (sufficient evidence of carcinogenicity in humans)
- Group B - Probable Human Carcinogen (B1-limited evidence of carcinogenicity in humans; B2-sufficient evidence of carcinogenicity in animals with inadequate or lack of evidence in humans)
- Group C - Possible Human Carcinogen (limited evidence of carcinogenicity in the animals and inadequate or lack of human data)
- Group D - Not Classifiable as to Human Carcinogenicity (inadequate or no evidence)

TABLE 4-2

**CANCER SLOPE FACTORS FOR POLYCYCLIC AROMATIC HYDROCARBONS  
(PAHs) OF POTENTIAL CONCERN IN CWMCS SURFACE SOILS AND AIR**

PAH	USEPA Weight of Evidence <sup>a</sup>	Toxicity Equivalency Factor (TEF) <sup>a</sup>	Oral Slope Factor <sup>b</sup> (mg/kg-day) <sup>-1</sup>	Inhalation Slope Factor <sup>c</sup> (mg/kg-day) <sup>-1</sup>
Benzo(a)pyrene	B2	1.0	7.3	6.1
Benzo(a)anthracene	B2	0.1	0.73	0.61
Benzo(b)fluoranthene	B2	0.1	0.73	0.61
Benzo(k)fluoranthene	B2	0.1	0.73	0.61
Chrysene	B2	0.001	0.0073	0.0061
Fluoranthene	D	NA	--	--
Indeno(1,2,3-cd)pyrene	B2	0.1	0.73	0.61
Phenanthrene	D	NA	--	--
Pyrene	D	NA	--	--

<sup>a</sup> TEF approach adopted by Region IX.

<sup>b</sup> Oral slope factors for PAHs other than BaP were derived by multiplying the oral slope factor for BaP of 7.3 mg/kg-day<sup>-1</sup> listed in IRIS (USEPA 1993a) times the TEF listed for each PAH.

<sup>c</sup> Inhalation slope factors for PAHs other than BaP were derived by multiplying the inhalation slope factor for BaP of 6.1 mg/kg-day<sup>-1</sup> listed in HEAST (USEPA 1993a) times the TEF listed for each PAH.

<sup>d</sup> These PAHs are classified as Class D carcinogens (i.e., not classifiable as human carcinogens). Class D carcinogens are not quantified in human health risk assessments (USEPA, 1989a).

\* Group B - Probable Human Carcinogen (B2-sufficient evidence of carcinogenicity in animals with inadequate or lack of evidence in humans)

Group D - Not Classifiable as to Human Carcinogenicity (inadequate or no evidence)

TABLE 4-3

## TOXICOLOGICAL PROFILES FOR CHEMICALS OF POTENTIAL CONCERN IN SOIL

CHEMICAL	ACUTE TOXICITY SUMMARY	CHRONIC TOXICITY SUMMARY	CANCER POTENTIAL	OTHER
<b>INORGANIC COMPOUNDS</b>				
Antimony	Many antimony compounds irritate the gastrointestinal tract; antimony tartar has been used as an emetic; intoxication results in severe vomiting and diarrhea. With occupational inhalation exposure, rhinitis and acute pulmonary edema may occur.	Inhalation of some antimony compounds can produce rhinitis, pharyngitis, tracheitis, bronchitis, and pneumoconiosis with obstructive lung disease and emphysema. Transient spots on the skin have been reported in workers. Antimony may form stibine gas, which causes hemolysis.	Cancer potential is not indicated. In mutation tests, some antimony compounds were positive in human lymphocytes and hamster embryo cells.	Antimony can exist as trivalent or pentavalent compounds. Trivalent antimony compounds have been used for treatment of parasites.  Reference: ATSDR, 1990.
Beryllium	Acute lung disease (chemical pneumonitis) has been observed immediately after inhalation of aerosols of soluble and insoluble beryllium compounds in broken fluorescent light tubes. Several months after exposure the entire respiratory tract may become inflamed with fulminating pneumonitis in severe reactions. Recoveries usually occur within weeks, but fatalities have occurred. In studies with monkeys, high concentrations of aerosols of beryllium fluoride or beryllium phosphate produced severe lung reactions in all animals and damaged the liver and kidney as well as affecting adrenals, pancreas, thyroid, and spleen; many lesions were similar to those in patients who died of pneumonitis. Conjunctivitis and contact dermatitis may follow exposure to beryllium, with skin lesions or ulcerations. Beryllium compounds may produce hypersensitivity with delayed allergic reactions.	The lung is a major target organ for toxic effects of beryllium. Berylliosis, a chronic granulomatous lung disease that is frequently fatal, has been described for over 40 years among workers exposed to insoluble beryllium compounds; symptoms may include shortness of breath, cyanosis, clubbed fingers, and lesions that progress to fibrotic tissue and nodules with respiratory dysfunction.	Beryllium compounds or alloys have produced cancer in rats, rabbits, and monkeys. Lung tumors have been reported in rats and monkeys exposed by inhalation, intratracheally, or intrabronchial implantation, and bone tumors have been produced in rabbits after intravenous or intraosseous administration. Excess lung cancer has been observed in some studies of workers occupationally exposed to beryllium, but data on exposure and confounding factors were lacking. Beryllium and its compounds have been classified by IARC as having sufficient evidence of being carcinogenic in animals and limited evidence in humans, and by EPA as a probable human carcinogen. Some beryllium compounds are mutagenic in vitro.	Wide variations in individual sensitivity have been reported, perhaps because of an immune reaction; individuals exposed to low doses may exhibit severe effects. Beryllium is stored in the body for many years with detectable amounts in lung reported as long as 23 years after exposure.  Reference: ATSDR, 1988a.



# TOXICITY PROFILES FOR SELECTED CHEMICALS

CHEMICAL	ACUTE TOXICITY SUMMARY	CHRONIC TOXICITY SUMMARY	CANCER POTENTIAL	OTHER
Cadmium	For acute exposure by ingestion, symptoms of cadmium toxicity included nausea, vomiting, diarrhea, muscular cramps, salivation, spasms, drop in blood pressure, vertigo, loss of consciousness, and collapse. Acute renal failure, liver damage, and death may occur. Exposure by inhalation can cause irritation, coughing, labored respiration, vomiting, acute chemical pneumonitis, and pulmonary edema.	Respiratory and renal toxicity are major effects in workers. Chronic oral exposures can produce kidney damage. Cadmium accumulates in kidney, and nephropathy results after critical concentration in kidney is reached, probably about 200 µg/g. Inhalation can cause chronic obstructive pulmonary disease, including bronchitis, progressive fibrosis, and emphysema. Chronic exposure affects calcium metabolism and can cause loss of calcium from bone, bone pain, osteomalacia, and osteoporosis. Chronic exposure may be associated with hypertension. Cadmium can produce testicular atrophy, sterility, and teratogenic effects in experimental animals.	Increased risk of prostate cancer and perhaps respiratory tract cancer have been seen in workers exposed by inhalation. No evidence of carcinogenicity from chronic oral exposure exists.	Reference: ATSDR, 1989a.
Chromium	The major acute effect from oral exposure is renal tubular necrosis. Inhalation of chromate salts results in irritation and inflammation of nasal mucosa, ulceration, and perforation of nasal septum.	Chronic exposure to hexavalent chromium has resulted in kidney damage in animals and humans. Inhalation exposures to chromates in industrial settings have resulted in nasal membrane inflammation, chronic rhinitis, laryngitis, and pharyngitis. Exposures to skin can result in allergic skin reactions in sensitive individuals. Overall, hexavalent forms are usually more toxic than trivalent forms.	Hexavalent chromium is considered a known human carcinogen. Excess lung cancer has been associated with workers in the chromate-producing industry. Chromate salts have been shown to be carcinogenic in rats exposed by inhalation in some studies.	Trivalent chromium is an essential element in human nutrition. Chromium toxicity is related to valence state.  Reference: ATSDR, 1989b.

# TOXICITY PROFILES FOR SELECTED CHEMICALS

CHEMICAL	ACUTE TOXICITY SUMMARY	CHRONIC TOXICITY SUMMARY	CANCER POTENTIAL	OTHER
Copper	Inhalation of copper dusts results in symptoms similar to metal fume fever. Exposure to metal fumes results in upper respiratory tract irritation, metallic or sweet taste, metal fume fever, and skin and hair discoloration. Exposure to dusts and mists of copper salts results in congestion of nasal mucous membranes, sometimes of the pharynx, and occasional ulceration and perforation of nasal septum. Acute copper sulfate poisoning in humans via oral intake is sometimes fatal. Symptoms include vomiting, diarrhea, hypotension, coma, and jaundice.	Hemolytic anemia occurs after chronic exposure in some dialysis patients. Sensitive individuals include those with metabolism disorders (e.g.,		
Lead	Acute inorganic lead intoxication in humans is characterized by encephalopathy, abdominal pain, hemolysis, liver damage, renal tubular necrosis, seizures, coma, and respiratory arrest.	Chronic low levels of exposure to lead can affect the hematopoietic system, the nervous system, and the cardiovascular system. Lead inhibits several key enzymes involved in heme biosyntheses. One characteristic effect of chronic lead intoxication is anemia, by reduction of both hemoglobin production and shortened erythrocyte survival. In humans, lead exposure has resulted in nervous system injury including reduced hand-eye coordination, reaction time, visual motor performance, and nerve conduction velocity. Developing children appear especially sensitive to lead-induced nervous system injury. Lead can also affect the immune system and produce gingival lead lines. Epidemiological studies have indicated that chronic lead exposure may be associated with increased blood pressure in humans. Exposure to lead is associated with sterility, abortion, neonatal mortality, and morbidity. Organolead compounds are neurotoxic.	Lead salts have shown some evidence of carcinogenicity in animals at very high exposure levels.	Children are especially sensitive to low-level exposures to lead.  Reference: ATSDR, 1988b.

# TOXICITY PROFILES FOR SELECTED CHEMICALS

CHEMICAL	ACUTE TOXICITY SUMMARY	CHRONIC TOXICITY SUMMARY	CANCER POTENTIAL	OTHER
Mercury	Inhalation of mercury vapor can cause bronchitis and nervous system effects. Oral exposure can result in abdominal cramps, gastrointestinal effects, ulceration, shock, circulatory collapse, and renal failure.	Occupational exposure to inorganic mercury can produce effects on nervous system, including tremors, erethism, muscular weakness, personality changes, gingivitis, and colored eye reflex. In children, pink disease has been reported after ingestion of mercurous compounds. Exposure to organic mercury can cause sensory and visual disturbances, tingling, paresthesia, numbness, tunnel vision leading to blindness, visual and peripheral neuropathy, weakness in extremities and progressive ataxia, tremor, cerebral atrophy, degeneration of nerves, and death.	Mercury is not known to be carcinogenic in humans or laboratory animals.	Mercury is transferred transplacentally. Toxicity depends on chemical form. Metallic, organic, and inorganic compounds can be biotransformed.  Reference: ATSDR, 1989c.
Selenium	Acute exposure can produce CNS effects including nervousness, drowsiness, and convulsions, and eye and nasal irritation.	Chronic inhalation exposure to selenium-containing compounds can result in pallor, coated tongue, gastrointestinal disorders, nervousness, garlic breath, liver and spleen damage, anemia, and mucosal irritation. Discoloration, decayed teeth, skin eruptions, gastrointestinal distress, and loss of hair and nails have been reported in humans exposed orally. In livestock, excess intake can cause blind staggers--impaired vision, weak limbs, respiratory failure--and alkali disease--hair loss, sterility, atrophy of hooves, lameness, and anemia. Selenium is embryotoxic and teratogenic in animals.	Selenium is carcinogenic in laboratory animals, but may be anticarcinogenic and protective in humans.	Selenium is an essential element in humans. Its toxicity is related to chemical form.  Reference: ATSDR, 1989d.
Silver	Argyria (local or generalized impregnation of tissue causing discoloration of skin and eye) may effect eyes and respiratory tract. Gastrointestinal irritation may occur with oral exposure.	Kidney and lung damage and possibly arteriosclerosis have been reported for industrial or medial exposures.	Silver is not known to be carcinogenic in humans or laboratory animals.	Reference: ATSDR, 1989e.

# TOXICITY PROFILES FOR SELECTED CHEMICALS

CHEMICAL	ACUTE TOXICITY SUMMARY	CHRONIC TOXICITY SUMMARY	CANCER POTENTIAL	OTHER
Zinc	Acute adverse effects of zinc include: metal fume fever by inhalation of fumes; and fever, nausea, vomiting, stomach cramps, and diarrhea from ingestion.	Prolonged ingestion of zinc can result in irritability, muscular stiffness and pain, loss of appetite, and nausea. High levels of zinc in diet may retard growth and produce defective mineralization of bone.	Zinc is not known to be carcinogenic in humans or laboratory animals.	Zinc is an essential nutrient in human nutrition. The taste threshold is 15 ppm in water; 40 ppm soluble zinc salts in water imparts a metallic taste.  Reference: ATSDR, 1988c.
<b>POLYCYCLIC AROMATIC HYDROCARBONS</b>				
Benzo(a)anthracene	No information is available on short-term dermal or inhalation effects.	No information is available on systemic effects. PAHs as a group may cause skin disorders and have immunosuppressive effects.	Evidence exists that benzo(a)anthracene is carcinogenic to laboratory animals through dermal and ingestion exposure routes. May cause skin and lung cancer. Benzo(a)anthracene has been shown to be mutagenic in laboratory experiments.	Benzo(a)anthracene may be metabolized into reactive derivatives.  References: IARC, 1984a,b, 1985.
Benzo(a)pyrene	Acute toxicity appears low when administered by oral or dermal routes to laboratory animals.	Prolonged exposure may produce chronic dermatitis and reproductive changes. Repeated oral doses to mice have caused hypoplastic anemia. PAHs as a group may cause skin disorders and have immunosuppressive effects.	Benzo(a)pyrene is a constituent of coal tar, which is classified as a known carcinogen by IARC and a probable carcinogen by the EPA. Ingestion may produce stomach tumors, and inhalation may produce lung cancer. Prolonged skin exposure has been linked to an increase in skin cancer among workers. Benzo(a)pyrene is considered to be the most potent carcinogenic PAH. Benzo(a)pyrene is a mutagen.	References: IARC, 1984a,b, 1985.
Benzo(b)fluoranthene	No information is available.	Systemic effects specific to benzo(b)fluoranthene have not been reported. PAHs as a group may cause skin disorders and have immunosuppressive effects.	Experimental evidence exists of lung and skin cancer in laboratory animals induced by dermal absorption and intratracheal distillation.	References: IARC, 1984a,b, 1985.
Benzo(k)fluoranthene	Little information is available.	Limited information is available. PAHs as a group may cause skin disorders and have immunosuppressive effects.	Benzo(k)fluoranthene is a probable human carcinogen.	References: IARC, 1984a,b, 1985.

**TOXICITY PROFILES FOR SELECTED CHEMICALS**

CHEMICAL	ACUTE TOXICITY SUMMARY	CHRONIC TOXICITY SUMMARY	CANCER POTENTIAL	OTHER
Chrysene	Chrysene is absorbed orally and dermally.	Chrysene accumulates in adipose and mammary tissues. PAHs as a group may cause skin disorders and have immunosuppressive effects.	Chrysene is carcinogenic in laboratory animals exposed to prolonged dermal doses. There is limited evidence that chrysene is mutagenic. Epidemiological reports indicate the incidence of skin cancer due to exposure to PAH mixtures which included chrysene.	References: IARC, 1984a,b, 1985.
Fluoranthene	Fluoranthene is toxic by oral and dermal absorption. It is a defatting agent that may affect the skin, and can cross epithelial membranes.	Limited information is available. PAHs as a group may cause skin disorders and have immunosuppressive effects.	There is no evidence that fluoranthene is carcinogenic. Cocarcinogenic effects have occurred following simultaneous dermal exposures with other PAHs.	References: IARC, 1984a,b, 1985.
Indeno(1,2,3-c,d)pyrene	Little information is available.	Limited information is available. PAHs as a group may cause skin disorders and have immunosuppressive effects.	This compound is a probable human carcinogen.	References: IARC, 1984a,b, 1985.
Phenanthrene	Phenanthrene is an irritant through inhalation and ingestion exposure, and may also be dermally absorbed. Phenanthrene can cause photosensitization of the skin.	Phenanthrene may be an allergen. PAHs as a group may cause skin disorders and have immunosuppressive effects.	Cancer potential is not indicated.	References: IARC, 1984a,b, 1985.
Pyrene	Limited information is available.	Limited information is available. PAHs as a group may cause skin disorders and have immunosuppressive effects. Evidence suggests that pyrene is cocarcinogenic in laboratory animal experiments.		References: IARC, 1984a,b, 1985.

# TOXICITY PROFILES FOR SELECTED CHEMICALS

CHEMICAL	ACUTE TOXICITY SUMMARY	CHRONIC TOXICITY SUMMARY	CANCER POTENTIAL	OTHER
<b>VOLATILE AND SEMIVOLATILE COMPOUNDS</b>				
1,1-Dichloroethylene (Vinylidene chloride; 1,1-DCE)	Contact may irritate or burn the skin. It is irritating to the eyes and may cause conjunctivitis and transient corneal injury. Inhalation of high concentrations produces CNS depression resulting in poor coordination, stupor, drunkenness, and unconsciousness. Narcosis has been noted at concentrations exceeding 4,000 ppm.	Inhalation may produce hepatic and renal dysfunction. Low-level oral or inhalation exposure produces symptoms similar to acute exposure. It was shown to be mutagenic in several bacterial test strains. It was also shown to be non-mutagenic in chinese hamster cells. Rats exposed by inhalation for six hours daily, five days per week, for 18 months at 25 or 75 ppm showed a target organ effect on the liver. The liver lesions, however, were reversible, as they disappeared during the last six months of the study after exposures had been discontinued.	1,1-DCE is classified as a possible human carcinogen, based on tumors observed in one mouse strain after inhalation exposure. It is mutagenic for <i>Salmonella typhimurium</i> in multiple assays. 1,1-DCE is structurally related to vinyl chloride, a known human carcinogen.	No toxic levels have been reported. A human study of 138 employees exposed to 5 to 20 ppm showed no changes in mortality or health parameters.  Reference: ATSDR, 1989f.
Hexachlorobenzene	Between 1954 and 1959 a large number of individuals in southeastern Turkey were exposed to hexachlorobenzene from the ingestion of seed grain treated with hexachlorobenzene as a fungicide. Approximately 5000 individuals developed adverse effects from this exposure with deaths of children under the age of 2 and about 4000 individuals developing porphyria.	The toxicity of long-term dietary exposure of humans to hexachlorobenzene was demonstrated by the epidemic of porphyria cutanea tarda (PCT) in Turkish citizens who accidentally consumed bread made from grain treated with hexachlorobenzene. In a subchronic rat study, exposure to the 32 mg/kg/day resulted in decreased survival, splenomegaly, and ataxia in females; increases in spleen-to-body weight and kidney-to-body weight ratios and intension tremors in males and females; and decreased body weight in males.	Hexachlorobenzene is considered a probable human carcinogen. When administered orally, has been shown to induce tumors in the liver, thyroid and kidney in three rodent species. Females were far more susceptible to hepatocarcinogenicity while males were generally more sensitive to renal carcinogenicity.	References: Cripps <i>et al.</i> , 1984; USEPA, 1985b; USEPA, 1988; USEPA, 1993a.

# TOXICITY PROFILES FOR SELECTED CHEMICALS

CHEMICAL	ACUTE TOXICITY SUMMARY	CHRONIC TOXICITY SUMMARY	CANCER POTENTIAL	OTHER
Methylene chloride	At high levels, it is a CNS depressant producing behavioral and performance deficits, depression, and coma, as well as toxicity to the liver, kidneys, and cardiovascular system. The CNS and liver are the primary target organs.	Oral exposure to drinking water resulted in changes in the blood and liver of rats. The potential for teratogenicity is low.	Methylene chloride is a probable human carcinogen based on evidence of carcinogenicity from inhalation bioassays using rats and mice, and lack of evidence in humans. Rats developed benign mammary gland neoplasms, and mice alveolar/bronchiolar and hepatocellular neoplasms. No conclusive association between exposure and incidence of liver or lung tumors found from human epidemiological studies. It is judged to be weakly mutagenic.	Methylene chloride is lethal to humans if swallowed or inhaled. It is absorbed through and is distributed rapidly from lung and gut, and is highly lipid-soluble.  Reference: ATSDR, 1989g.

Sources: ATSDR (1988-present); Casarett and Doull's *Toxicology* (1991); IARC (1985; 1984a,b); NRC (1977-1989); Sax and Lewis (1989); Sullivan and Krieger (1992); *Toxic and Hazardous Industrial Chemicals Safety Manual for Handling and Disposal with Toxicity and Hazard Data*; USEPA (1993a,b,c);

## 5.0 RISK CHARACTERIZATION (REVISED)

Risk characterization is the description of the nature and magnitude of the potential human health risk associated with the CWMCS facility under the assumed exposure scenarios. It combines the results of the health assessment (i.e., hazard identification and dose-response assessment) and exposure assessment portions to provide numerical estimates of health risk. In accordance with USEPA (1989a) guidance, a conservative (health-protective) approach that is likely to overestimate, rather than underestimate, the risk was used in this assessment. Risks were calculated for both current and future land use scenarios.

### 5.1 Risks Associated with Human Exposure to Chromium

The toxicity of chromium depends upon the form (species) in which it occurs in the environment. While  $\text{Cr}^{+6}$  is generally considered more toxic than  $\text{Cr}^{+3}$ , chromium occurs in nature primarily as  $\text{Cr}^{+3}$  (Callahan *et al.*, 1979). Hexavalent chromium is considered a known human carcinogen. Excess lung cancer has been associated with workers in the chromate producing industry. Furthermore, USEPA (1993a,b) has developed separate RfDs for  $\text{Cr}^{+3}$  and  $\text{Cr}^{+6}$  (Table 4-1). Since facility-specific data on the fraction of chromium in surface soils that is actually  $\text{Cr}^{+6}$  were collected, these data were used in the risk assessment calculations.  $\text{Cr}^{+6}$  levels measured in all three surface soil samples analyzed were below current detection limits ( $<0.57$  to  $<0.62$  mg/kg). However, since only three surface soil samples were analyzed for  $\text{Cr}^{+6}$ , data collected at chromite ore processing facilities were used to model RME exposures. Paustenbach *et al.* (1991) reported that chromite ore processing residues, also called slag, typically contain 1 to 5 percent chromium VI. Using these data and the fact that  $\text{Cr}^{+6}$  is very soluble and does not sorb readily to clay (Callahan *et al.*, 1979), we assumed that 1% of the total chromium sorbed to soil particulates was  $\text{Cr}^{+6}$  for the RME scenario. If the resulting hazard indices exceeded unity or risk estimates exceeded  $1 \times 10^{-6}$ , average risks were calculated assuming that all chromium measured in facility surface soils is  $\text{Cr}^{+3}$ . This approach is conservative, since site-specific data indicate that all chromium measured may, in fact, be  $\text{Cr}^{+3}$ .



## 5.2 Potential Risks Associated With Current Land Use Conditions

Potential risks associated with current land use conditions were calculated for on-site workers assuming that current workers were exposed to COPCs in surface soil samples collected inside the fence only ( $n = 11$ ). Potential risks associated with exposure to facility-related COPCs for off-site residents, trespassers, and recreational users of Lake Calumet were not quantified as detailed in Sections 3.1.2 through 3.1.4 of this report. Tables 5-1 and 5-2 present individual COPC hazard quotients (HQs) and pathway hazard indices (HIs) for all three receptor groups (workers) exposed to facility-related COPCs via incidental ingestion of soil and dermal contact with soil, respectively. In this and subsequent tables, "NA" was used when toxicity data were not available for a given COPC. Given the lack of USEPA-approved toxicity constants (RfDs, RfCs, or CSFs) for these chemicals, hazard quotients and risk estimates could not be calculated. Potential risks from exposure to non-carcinogenic chemicals were treated additively rather than individually. Since the target organ of toxicity is variable for the COPCs (see Table 4-1), a summary hazard index calculation for all COPCs is likely to substantially overestimate these values, and thus be conservative.

Table 5-1 shows that all individual chemical HQs and pathway HIs for the soil ingestion pathway were less than 1 for all three worker groups evaluated. Pathway HIs ranged from 0.008 for the current on-site security worker to 0.1 for the current short-term impoundment remediation worker. Table 5-2 shows that all individual chemical HQs and pathways HIs for the dermal absorption pathway were also less than 1 for all three on-site worker groups evaluated. Pathway HIs are estimated to be 0.02 for the current remediation (impoundment) worker and  $2 \times 10^{-11}$  for the current incineration and security workers.

Inhalation reference concentrations (RfCs) were available for mercury and methylene chloride only (Table 4-1). Using these RfCs, inhalation pathway HIs are estimated to be  $1 \times 10^{-6}$ ,  $8 \times 10^{-7}$ , and  $8 \times 10^{-7}$ , for the current remediation, security, and incineration workers, respectively. Cumulative RME HIs (i.e., the HI value summed across all three complete exposure pathways) are summarized in Table 5-3. Table 5-3 shows that the cumulative RME HI for the incineration,

security, and remediation workers are all less than 1, indicating no reason for health risk concern. Cumulative RME HIs are estimated to be 0.008 for the current security worker, 0.01 for the incineration worker, and 0.1 for the current short-term impoundment remediation worker. Table 5-3 shows that adverse, non-carcinogenic health effects are not probable for individuals who may be currently exposed to contaminants from ingestion or dermal contact with soil and via inhalation of particulates.

Tables 5-4 through 5-6 present chemical-specific and cumulative upper bound individual excess cancer risk estimates for all receptor groups under the RME scenario via soil ingestion, dermal absorption, and inhalation of particulates, respectively. Table 5-4 shows that risk estimates for the soil ingestion pathway are less than or equal to  $1 \times 10^{-6}$  for each of the COPCs identified for surface soil. Pathway risk estimates are  $3 \times 10^{-7}$  for the on-site security worker,  $6 \times 10^{-7}$  for the incineration worker, and  $3 \times 10^{-7}$  for the short-term remediation worker. Table 5-5 shows that chemical-specific risk estimates for the dermal pathway are also less than  $1 \times 10^{-6}$ . Pathway risk estimates for the dermal pathway are  $3 \times 10^{-15}$  for the current incineration worker and security worker and  $2 \times 10^{-7}$  for the short-term remediation worker. The short-term remediation was assumed to be exposed directly to COPCs present in surface soil, while the incineration and security workers were assumed to be exposed to COPCs in fugitive dust. Table 5-6 shows that the potential individual excess lifetime cancer risks associated with inhalation of particulates that may be resuspended from the surface soil are negligible relative to risks from incidental ingestion of soil. Cumulative RME potential individual excess cancer inhalation risks for current receptors range from  $2 \times 10^{-8}$  for the current incineration and security workers to  $4 \times 10^{-9}$  for the impoundment remediation worker (Table 5-6). Cumulative RME potential lifetime excess cancer risks (i.e., risks summed across all three complete exposure pathways) are estimated to be  $3 \times 10^{-7}$  for the individual who routinely patrols the property,  $6 \times 10^{-7}$  for individuals who work in and around the incineration complex, and  $5 \times 10^{-7}$  for the short-term remediation worker (Table 5-7). For the incineration and security workers, more than 90% of the cumulative excess lifetime cancer risk is attributable to incidental ingestion of soil. For the short-term remediation worker, 60% is due to incidental ingestion of soil, while 40% is attributable to dermal contact with soil.

### 5.3 Future Land Use Conditions

Future land use conditions were modeled assuming two different exposure scenarios. The first scenario assumed that workers in the future would potentially be exposed to facility-related COPCs in air (particulates) and surface soil eight hours a day, five days a week, 50 weeks a year, for eight years. This scenario is referred to as using facility-specific exposure data. The second scenario evaluated worker exposures assuming that all individuals were on-site eight hours a day, five days a week, 50 weeks a year, for 25 years (USEPA, 1991a). All future receptors were assumed to be exposed to surface soils facility-wide ( $n = 20$ ).

Table 5-8 presents HQs and pathway HIs for future receptors exposed via incidental ingestion of soil, dermal contact with soil, and inhalation of particulates assuming standard default exposure parameters (USEPA, 1991a). Table 5-8 shows that all HQs and pathway HIs are less than 1 regardless of the exposure pathway. Pathway HIs range from  $2 \times 10^{-11}$  for dermal contact with fugitive dust to 0.04 for incidental ingestion of soil. Table 5-9 presents chemical-specific and cumulative excess lifetime cancer risk estimates for the hypothetical future workers for the RME scenario via soil ingestion, dermal absorption, and inhalation of particulates assuming standard default exposure data. Pathway facility-specific excess cancer risks are estimated to be  $8 \times 10^{-6}$  for the ingestion pathway,  $7 \times 10^{-8}$  for inhalation, and  $1 \times 10^{-14}$  for the dermal pathway (Table 5-9). The cumulative facility-specific excess lifetime cancer risk for the hypothetical future worker is estimated to be  $8 \times 10^{-6}$  (Table 5-10). Ninety-nine percent of this risk is attributable to incidental ingestion of soil, while one percent is associated with inhalation of resuspended dust. Dermal contact with soil was a minor pathway of exposure. It should be emphasized, however, that these risks estimates reflect the assumption that hypothetical future workers would be exposed to site-related contaminants eight hours a day, five days a week, 50 weeks a year, for 25 years.

Table 5-11 presents HQs and pathway HIs for future receptors exposed via incidental ingestion of soil, dermal contact with soil, and inhalation of particulates assuming site-specific exposure parameters. Table 5-11 shows that all HQs and pathway HIs are less than 1 regardless of the

exposure pathway. Pathway HIs range from  $2 \times 10^{-11}$  for dermal contact with fugitive dust to 0.01 for incidental ingestion of soil. Table 5-12 presents chemical-specific and cumulative excess lifetime cancer risk estimates for hypothetical future workers via soil ingestion, dermal absorption, and inhalation of particulates assuming site-specific exposure data. Pathway facility-specific excess cancer risks are estimated to be  $6 \times 10^{-7}$  for the ingestion pathway,  $2 \times 10^{-8}$  for inhalation, and  $3 \times 10^{-15}$  for the dermal pathway (Table 5-11). The cumulative facility-specific excess lifetime cancer risk for the hypothetical future worker is estimated to be  $6 \times 10^{-7}$  (Table 5-10). Ninety-seven percent of this risk is attributable to incidental ingestion of soil, while 3% is associated with inhalation of resuspended dust. Dermal contact with soil was a minor pathway of exposure.

#### 5.4 Risks Associated With Future Average Exposures

Average risks were calculated for the hypothetical future worker assumed to work on-site for 25 years, since the RME cumulative risk estimates for these two receptor groups exceeded  $1 \times 10^{-6}$  (risk =  $8 \times 10^{-6}$ ). Average risks were not calculated for all current receptors and for future workers assumed to be exposed using facility-specific assumptions, since risk estimates for all of these receptor groups were less than  $1 \times 10^{-6}$ . Similarly, average HQs and pathway HIs were not calculated, since HIs for all receptor groups were less than unity.

Average risks were calculated using the appropriate mean (depending on whether the data for a given chemical were lognormally or normally distributed) concentration of COPCs in soil facility-wide ( $n = 20$ ) and COPCs in fugitive dust facility-wide ( $n = 20$ ). In addition, for the dermal pathway, an average adherence factor of 0.2 was used (EPA, 1992b). Finally, all chromium measured in facility soils was assumed to be  $\text{Cr}^{+3}$ . Cumulative average excess cancer risks are presented in Table 5-13 for the hypothetical future worker. Average pathway risk estimates for the hypothetical future worker assumed to be on-site 8 hours/day, 5 days/week, 250 days/year, for 25 years were  $1 \times 10^{-15}$  for dermal contact with fugitive dust,  $6 \times 10^{-9}$  for inhalation of particulates, and  $3 \times 10^{-6}$  for incidental ingestion of soil (Table 5-13). The

cumulative average excess lifetime cancer risk for these hypothetical future workers is estimated to be  $3 \times 10^{-6}$ .

**TABLE 5-1**  
**CHEMICAL-SPECIFIC HAZARD QUOTIENTS AND CUMULATIVE HAZARD INDICES**  
**FOR ALL THREE CURRENT RECEPTORS EXPOSED VIA INCIDENTAL INGESTION**  
**OF SOIL ASSUMING REASONABLE MAXIMUM EXPOSURES**

Chemical	On-Site Security Worker <sup>a</sup>	On-Site Incineration Worker <sup>a</sup>	On-Site Remediation Worker <sup>a</sup>
<b>METALS</b>			
Antimony	0.004	0.007	0.05
Beryllium	$2 \times 10^{-5}$	$5 \times 10^{-5}$	$3 \times 10^{-4}$
Cadmium	0.004	0.007	0.05
Chromium (total)	$6 \times 10^{-5}$	$1 \times 10^{-4}$	$8 \times 10^{-5}$
Chromium VI <sup>b</sup>	$1 \times 10^{-4}$	$2 \times 10^{-4}$	$4 \times 10^{-4}$
Copper	$8 \times 10^{-5}$	$2 \times 10^{-4}$	0.001
Lead	NA <sup>c</sup>	NA	NA
Mercury	$3 \times 10^{-5}$	$6 \times 10^{-5}$	$4 \times 10^{-4}$
Selenium	$2 \times 10^{-5}$	$4 \times 10^{-5}$	$4 \times 10^{-4}$
Silver	$4 \times 10^{-5}$	$7 \times 10^{-5}$	$5 \times 10^{-4}$
Zinc	$3 \times 10^{-5}$	$7 \times 10^{-5}$	$5 \times 10^{-4}$
<b>ORGANICS</b>			
Benzo(a)anthracene	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA
Benzo(b)fluoranthene	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	NA
Chrysene	NA	NA	NA
1,1-dichloroethylene	$6 \times 10^{-8}$	$1 \times 10^{-7}$	$9 \times 10^{-7}$
Fluoranthene	$3 \times 10^{-6}$	$5 \times 10^{-6}$	$6 \times 10^{-6}$
Hexachlorobenzene	$5 \times 10^{-5}$	$1 \times 10^{-4}$	$7 \times 10^{-4}$
Indeno(1,2,3-cd)pyrene	NA	NA	NA
Methylene chloride	$4 \times 10^{-9}$	$8 \times 10^{-9}$	$6 \times 10^{-8}$
Phenanthrene	NA	NA	NA
Pyrene	$2 \times 10^{-5}$	$4 \times 10^{-5}$	$7 \times 10^{-6}$
<b>PATHWAY HI</b>	<b>0.01</b>	<b>0.01</b>	<b>0.1</b>

<sup>a</sup> Assumed to be exposed to the upper-bound or maximum (whichever was lower) concentration of COPCs in surface soils inside the fence only (n = 11).

<sup>b</sup> Chromium VI was assumed to be 1% of total chromium measured (see Section 5.1).

<sup>c</sup> An oral reference dose is not available for that chemical; hence, a hazard quotient cannot be calculated.

**TABLE 5-2**  
**CHEMICAL-SPECIFIC HAZARD QUOTIENTS AND CUMULATIVE HAZARD INDICES**  
**FOR ALL THREE CURRENT RECEPTORS EXPOSED VIA DERMAL CONTACT WITH**  
**SOIL ASSUMING REASONABLE MAXIMUM EXPOSURES**

Chemical	On-Site Security Worker <sup>a</sup>	On-Site Incineration Worker <sup>a</sup>	On-Site Remediation Worker <sup>b</sup>
<b>METALS</b>			
Antimony	1x10 <sup>-11</sup>	1x10 <sup>-11</sup>	0.008
Beryllium	7x10 <sup>-14</sup>	7x10 <sup>-14</sup>	5x10 <sup>-5</sup>
Cadmium	4x10 <sup>-12</sup>	4x10 <sup>-12</sup>	0.008
Chromium (total)	3x10 <sup>-13</sup>	3x10 <sup>-13</sup>	1x10 <sup>-5</sup>
Chromium VI <sup>c</sup>	6x10 <sup>-13</sup>	6x10 <sup>-13</sup>	6x10 <sup>-5</sup>
Copper	3x10 <sup>-13</sup>	3x10 <sup>-13</sup>	2x10 <sup>-4</sup>
Lead	NA <sup>d</sup>	NA	NA
Mercury	2x10 <sup>-13</sup>	2x10 <sup>-13</sup>	6x10 <sup>-5</sup>
Selenium	5x10 <sup>-14</sup>	5x10 <sup>-14</sup>	4x10 <sup>-5</sup>
Silver	1x10 <sup>-13</sup>	1x10 <sup>-13</sup>	8x10 <sup>-5</sup>
Zinc	3x10 <sup>-13</sup>	3x10 <sup>-13</sup>	7x10 <sup>-5</sup>
<b>ORGANICS</b>			
Benzo(a)anthracene	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA
Benzo(b)fluoranthene	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	NA
Chrysene	NA	NA	NA
1,1-dichloroethylene	7x10 <sup>-15</sup>	7x10 <sup>-15</sup>	7x10 <sup>-6</sup>
Fluoranthene	2x10 <sup>-13</sup>	2x10 <sup>-13</sup>	4x10 <sup>-6</sup>
Hexachlorobenzene	3x10 <sup>-12</sup>	3x10 <sup>-12</sup>	6x10 <sup>-4</sup>
Indeno(1,2,3-cd)pyrene	NA	NA	NA
Methylene chloride	6x10 <sup>-16</sup>	6x10 <sup>-16</sup>	5x10 <sup>-7</sup>
Phenanthrene	NA	NA	NA
Pyrene	2x10 <sup>-13</sup>	2x10 <sup>-13</sup>	6x10 <sup>-6</sup>
<b>PATHWAY HI</b>	2x10 <sup>-11</sup>	2x10 <sup>-11</sup>	0.02

<sup>a</sup> Assumed to be exposed to the upper-bound or maximum (whichever was lower) concentration of COPCs in fugitive dust facility wide (n = 20).

<sup>b</sup> Assumed to be exposed to the upper-bound or maximum (whichever was lower) concentration of COPCs in surface soils inside the fence only (n = 11).

<sup>c</sup> Chromium VI was assumed to be 1% of total chromium measured (see Section 5.1).

<sup>d</sup> An oral reference dose is not available for that chemical; hence, a hazard quotient cannot be calculated.

**TABLE 5-3**  
**CUMULATIVE HAZARD INDEX VALUES FOR ALL THREE**  
**CURRENT RECEPTORS AND ALL COMPLETE EXPOSURE PATHWAYS**  
**ASSUMING REASONABLE MAXIMUM EXPOSURES**

	Pathway Hazard Index for the Current On-Site Security Worker	Pathway Hazard Index for the Current On-Site Incineration Worker	Pathway Hazard Index for the Current On-Site Remediation Worker
<b>PATHWAY</b>			
Incidental Ingestion of Soil <sup>a</sup>	0.008 ( >99%) <sup>a</sup>	0.01 ( >99%)	0.1 ( >83%)
Dermal Contact with Soil <sup>a</sup>	$2 \times 10^{-11}$ ( <1%)	$2 \times 10^{-11}$ ( <1%)	0.02 (17%)
Inhalation of Particulates <sup>d</sup>	$8 \times 10^{-7}$ ( <1%)	$8 \times 10^{-7}$ ( <1%)	$1 \times 10^{-6}$ ( <1%)
<b>CUMULATIVE HAZARD INDEX</b>	<b>0.008</b>	<b>0.01</b>	<b>0.1</b>

<sup>a</sup> Percent contribution of that pathway to cumulative risk.

<sup>b</sup> See Table 5-1.

<sup>c</sup> See Table 5-2.

<sup>d</sup> See Section 5-2.



**TABLE 5-4**  
**CHEMICAL-SPECIFIC AND CUMULATIVE EXCESS LIFETIME CANCER RISK**  
**ESTIMATES FOR ALL THREE CURRENT RECEPTOR GROUPS EXPOSED VIA**  
**INCIDENTAL INGESTION OF SOIL ASSUMING REASONABLE MAXIMUM**  
**EXPOSURES**

Chemical	On-Site Security Worker <sup>a</sup>	On-Site Incineration Worker <sup>a</sup>	On-site Remediation Worker <sup>a</sup>
<b>METALS</b>			
Antimony	NA <sup>b</sup>	NA	NA
Beryllium	$6 \times 10^{-8}$	$1 \times 10^{-7}$	$1 \times 10^{-7}$
Cadmium	NA	NA	NA
Chromium (total)	NA	NA	NA
Chromium VI <sup>c</sup>	NA	NA	NA
Copper	NA	NA	NA
Lead	NA	NA	NA
Mercury	NA	NA	NA
Selenium	NA	NA	NA
Silver	NA	NA	NA
Zinc	NA	NA	NA
<b>ORGANICS</b>			
Benzo(a)anthracene	$8 \times 10^{-9}$	$2 \times 10^{-8}$	$2 \times 10^{-8}$
Benzo(a)pyrene	$2 \times 10^{-7}$	$3 \times 10^{-7}$	$1 \times 10^{-7}$
Benzo(b)fluoranthene	$8 \times 10^{-9}$	$2 \times 10^{-8}$	$1 \times 10^{-8}$
Benzo(k)fluoranthene	$8 \times 10^{-9}$	$2 \times 10^{-8}$	$1 \times 10^{-8}$
Chrysene	$1 \times 10^{-10}$	$3 \times 10^{-10}$	$1 \times 10^{-10}$
1,1-Dichloroethylene	$4 \times 10^{-11}$	$7 \times 10^{-11}$	$7 \times 10^{-11}$
Fluoranthene	NA	NA	NA
Hexachlorobenzene	$8 \times 10^{-9}$	$1 \times 10^{-8}$	$1 \times 10^{-8}$
Indeno(1,2,3-cd)pyrene	$5 \times 10^{-8}$	$1 \times 10^{-7}$	$1 \times 10^{-8}$
Methylene chloride	$2 \times 10^{-13}$	$4 \times 10^{-13}$	$4 \times 10^{-13}$
Phenanthrene	NA	NA	NA
Pyrene	NA	NA	NA
<b>PATHWAY RISK</b>	$3 \times 10^{-7}$	$6 \times 10^{-7}$	$3 \times 10^{-7}$

<sup>a</sup> Assumed to be exposed to the upper-bound or maximum (whichever was lower) concentration of COPCs in surface soils inside the fence only (n = 11).

<sup>b</sup> An oral slope factor is not available for that chemical; hence, a risk estimate cannot be calculated.

<sup>c</sup> Chromium VI was assumed to be 1% of total chromium measured (see Section 5.1).

**TABLE 5-5**  
**CHEMICAL-SPECIFIC AND CUMULATIVE EXCESS LIFETIME CANCER RISK**  
**ESTIMATES FOR ALL THREE CURRENT RECEPTOR GROUPS EXPOSED VIA**  
**DERMAL CONTACT WITH SOIL ASSUMING REASONABLE MAXIMUM EXPOSURES**

Chemical	On-Site Security Worker <sup>a</sup>	On-Site Incineration Worker <sup>b</sup>	On-site Remediation Worker <sup>b</sup>
<b>METALS</b>			
Antimony	NA <sup>c</sup>	NA <sup>b</sup>	NA
Beryllium	$2 \times 10^{-16}$	$2 \times 10^{-16}$	$2 \times 10^{-8}$
Cadmium	NA	NA	NA
Chromium (total)	NA	NA	NA
Chromium VI <sup>d</sup>	NA	NA	NA
Copper	NA	NA	NA
Lead	NA	NA	NA
Mercury	NA	NA	NA
Selenium	NA	NA	NA
Silver	NA	NA	NA
Zinc	NA	NA	NA
<b>ORGANICS</b>			
Benzo(a)anthracene	$6 \times 10^{-16}$	$6 \times 10^{-16}$	$2 \times 10^{-8}$
Benzo(a)pyrene	$1 \times 10^{-15}$	$1 \times 10^{-15}$	$1 \times 10^{-7}$
Benzo(b)fluoranthene	$3 \times 10^{-16}$	$3 \times 10^{-16}$	$2 \times 10^{-8}$
Benzo(k)fluoranthene	$2 \times 10^{-16}$	$2 \times 10^{-16}$	$1 \times 10^{-8}$
Chrysene	$2 \times 10^{-18}$	$2 \times 10^{-18}$	$1 \times 10^{-10}$
1,1-Dichloroethylene	$4 \times 10^{-19}$	$4 \times 10^{-19}$	$5 \times 10^{-10}$
Fluoranthene	NA	NA	NA
Hexachlorobenzene	$5 \times 10^{-16}$	$5 \times 10^{-16}$	$1 \times 10^{-8}$
Indeno(1,2,3-cd)pyrene	$3 \times 10^{-16}$	$3 \times 10^{-16}$	$1 \times 10^{-8}$
Methylene chloride	$3 \times 10^{-20}$	$3 \times 10^{-20}$	$3 \times 10^{-12}$
Phenanthrene	NA	NA	NA
Pyrene	NA	NA	NA
<b>PATHWAY RISK</b>	$3 \times 10^{-15}$	$3 \times 10^{-15}$	$2 \times 10^{-7}$

<sup>a</sup> Assumed to be exposed to the upper-bound or maximum (whichever was lower) concentration of COPCs in fugitive dust facility wide ( $n = 20$ ).

<sup>b</sup> Assumed to be exposed to the upper-bound or maximum (whichever was lower) concentration of COPCs in surface soils inside the fence only ( $n = 11$ ).

<sup>c</sup> An oral cancer slope factor is not available for that chemical; hence, a risk estimate cannot be calculated.

<sup>d</sup> Chromium VI was assumed to be 1% of total chromium measured (see Section 5.1).

**TABLE 5-6**  
**CHEMICAL-SPECIFIC AND CUMULATIVE EXCESS LIFETIME CANCER RISK**  
**ESTIMATES FOR ALL THREE CURRENT RECEPTOR GROUPS EXPOSED VIA**  
**INHALATION OF PARTICULATES ASSUMING REASONABLE MAXIMUM**  
**EXPOSURES**

Chemical	On-Site Security Worker	On-Site Incineration Worker	On-Site Remediation Worker
<b>METALS</b>			
Antimony	NA <sup>a</sup>	NA	NA
Beryllium	$5 \times 10^{-10}$	$5 \times 10^{-10}$	$8 \times 10^{-11}$
Cadmium	$3 \times 10^{-9}$	$3 \times 10^{-9}$	$6 \times 10^{-10}$
Chromium (total)	NA	NA	NA
Chromium VI <sup>b</sup>	$2 \times 10^{-8}$	$2 \times 10^{-8}$	$3 \times 10^{-9}$
Copper	NA	NA	NA
Lead	NA	NA	NA
Mercury	NA	NA	NA
Selenium	NA	NA	NA
Silver	NA	NA	NA
Zinc	NA	NA	NA
<b>ORGANICS</b>			
Benzo(a)anthracene	$1 \times 10^{-10}$	$1 \times 10^{-10}$	$2 \times 10^{-11}$
Benzo(a)pyrene	$3 \times 10^{-10}$	$3 \times 10^{-10}$	$6 \times 10^{-11}$
Benzo(b)fluoranthene	$6 \times 10^{-11}$	$6 \times 10^{-11}$	$1 \times 10^{-11}$
Benzo(k)fluoranthene	$5 \times 10^{-11}$	$5 \times 10^{-11}$	$8 \times 10^{-12}$
Chrysene	$5 \times 10^{-13}$	$5 \times 10^{-13}$	$8 \times 10^{-14}$
1,1-Dichloroethylene	$3 \times 10^{-14}$	$3 \times 10^{-14}$	$6 \times 10^{-15}$
Fluoranthene	NA	NA	NA
Hexachlorobenzene	$4 \times 10^{-10}$	$4 \times 10^{-10}$	$7 \times 10^{-11}$
Indeno(1,2,3-cd)pyrene	$5 \times 10^{-11}$	$5 \times 10^{-11}$	$9 \times 10^{-12}$
Methylene chloride	$2 \times 10^{-13}$	$2 \times 10^{-13}$	$3 \times 10^{-14}$
Phenanthrene	NA	NA	NA
Pyrene	NA	NA	NA
<b>PATHWAY RISK</b>	$2 \times 10^{-8}$	$2 \times 10^{-8}$	$4 \times 10^{-9}$

<sup>a</sup> An inhalation cancer slope factor is not available for that chemical; hence, a risk estimates could not be calculated;

<sup>b</sup> Chromium VI was assumed to be 1% of total chromium measured (see Section 5.1).

**TABLE 5-7**  
**CUMULATIVE EXCESS LIFETIME CANCER RISKS FOR ALL THREE CURRENT**  
**RECEPTOR GROUPS AND COMPLETE EXPOSURE PATHWAYS**  
**ASSUMING REASONABLE MAXIMUM EXPOSURES**

	Pathway Risk Estimate for the Current On-Site Security Worker	Pathway Risk Estimate for the Current On-Site Incineration Worker	Pathway Risk Estimate for the Current On-Site Remediation Worker
<b>PATHWAY</b>			
Incidental Ingestion of Soil <sup>b</sup>	$3 \times 10^{-7}$ (94%) <sup>a</sup>	$6 \times 10^{-7}$ (97%)	$3 \times 10^{-7}$ (91%)
Dermal Contact with Soil <sup>c</sup>	$3 \times 10^{-15}$ (<1%)	$3 \times 10^{-15}$ (<1%)	$2 \times 10^{-7}$ (9%)
Inhalation of Particulates <sup>d</sup>	$2 \times 10^{-8}$ (6%)	$2 \times 10^{-8}$ (3%)	$4 \times 10^{-9}$ (<1%)
<b>CUMULATIVE RISK</b>	$3 \times 10^{-7}$	$6 \times 10^{-7}$	$5 \times 10^{-7}$

<sup>a</sup> Percent contribution of that pathway to cumulative risk.

<sup>b</sup> See Table 5-4.

<sup>c</sup> See Table 5-5.

<sup>d</sup> See Table 5-6.

**TABLE 5-8**  
**CHEMICAL-SPECIFIC HAZARD QUOTIENTS AND CUMULATIVE HAZARD INDICES**  
**FOR THE HYPOTHETICAL FUTURE WORKER USING STANDARD DEFAULT**  
**EXPOSURE ASSUMPTIONS<sup>a</sup>**

Chemical	Incidental Ingestion Of Soil	Dermal Contact with Soil	Inhalation of Particulates
<b>METALS</b>			
Antimony	0.02	$1 \times 10^{-11}$	NA <sup>b</sup>
Beryllium	$2 \times 10^{-4}$	$7 \times 10^{-14}$	NA
Cadmium	0.008	$4 \times 10^{-12}$	NA
Chromium (total)	$7 \times 10^{-4}$	$3 \times 10^{-13}$	NA
Chromium VI <sup>c</sup>	0.001	$6 \times 10^{-13}$	NA
Copper	$6 \times 10^{-4}$	$3 \times 10^{-13}$	NA
Lead	NA	NA	NA
Mercury	$4 \times 10^{-4}$	$2 \times 10^{-13}$	$8 \times 10^{-7}$
Selenium	$1 \times 10^{-4}$	$5 \times 10^{-14}$	NA
Silver	$2 \times 10^{-4}$	$1 \times 10^{-13}$	NA
Zinc	$7 \times 10^{-4}$	$3 \times 10^{-13}$	NA
<b>ORGANICS</b>			
Benzo(a)anthracene	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA
Benzo(b)fluoranthene	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	NA
Chrysene	NA	NA	NA
1,1-Dichloroethylene	$3 \times 10^{-7}$	$7 \times 10^{-15}$	NA
Fluoranthene	$3 \times 10^{-5}$	$2 \times 10^{-13}$	NA
Hexachlorobenzene	0.001	$3 \times 10^{-12}$	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA
Methylene chloride	$3 \times 10^{-8}$	$6 \times 10^{-16}$	$1 \times 10^{-12}$
Phenanthrene	NA	NA	NA
Pyrene	$2 \times 10^{-4}$	$2 \times 10^{-13}$	NA
<b>PATHWAY HI</b>	<b>0.04</b>	<b><math>2 \times 10^{-11}</math></b>	<b><math>8 \times 10^{-7}</math></b>

<sup>a</sup> Hypothetical future workers were assumed to be exposed 8 hours/day, 5 days/week, 250 days/year, for 25 years (EPA, 1991a). Future workers were assumed to be exposed to COPCs in surface soil samples collected facility-wide (n = 20).

<sup>b</sup> An oral reference dose is not available for that chemical; hence, a hazard quotient cannot be calculated.

<sup>c</sup> Chromium VI was assumed to be 1% total measured chromium (see Section 5.1).

**TABLE 5-9**  
**CHEMICAL-SPECIFIC AND CUMULATIVE EXCESS LIFETIME CANCER RISK**  
**ESTIMATES FOR THE HYPOTHETICAL FUTURE WORKER USING STANDARD**  
**DEFAULT EXPOSURE ASSUMPTIONS<sup>a</sup>**

Chemical	Incidental Ingestion of Soil	Dermal Contact with Soil	Inhalation of Particulates
<b>METALS</b>			
Antimony	NA <sup>b</sup>	NA	NA
Beryllium	$1 \times 10^{-6}$	$6 \times 10^{-16}$	$1 \times 10^{-9}$
Cadmium	NA	NA	$1 \times 10^{-8}$
Chromium (total)	NA	NA	NA
Chromium VI <sup>c</sup>	NA	NA	$5 \times 10^{-8}$
Copper	NA	NA	NA
Lead	NA	NA	NA
Mercury	NA	NA	NA
Selenium	NA	NA	NA
Silver	NA	NA	NA
Zinc	NA	NA	NA
<b>ORGANICS</b>			
Benzo(a)anthracene	$2 \times 10^{-7}$	$2 \times 10^{-15}$	$4 \times 10^{-10}$
Benzo(a)pyrene	$4 \times 10^{-6}$	$4 \times 10^{-15}$	$9 \times 10^{-10}$
Benzo(b)fluoranthene	$3 \times 10^{-7}$	$9 \times 10^{-16}$	$2 \times 10^{-10}$
Benzo(k)fluoranthene	$3 \times 10^{-7}$	$7 \times 10^{-16}$	$1 \times 10^{-10}$
Chrysene	$9 \times 10^{-9}$	$7 \times 10^{-18}$	$1 \times 10^{-12}$
1,1-Dichloroethylene	$6 \times 10^{-10}$	$1 \times 10^{-17}$	$1 \times 10^{-13}$
Fluoranthene	NA	NA	NA
Hexachlorobenzene	$6 \times 10^{-7}$	$1 \times 10^{-15}$	$1 \times 10^{-9}$
Indeno(1,2,3-cd)pyrene	$1 \times 10^{-6}$	$1 \times 10^{-15}$	$1 \times 10^{-10}$
Methylene chloride	$4 \times 10^{-12}$	$1 \times 10^{-19}$	$6 \times 10^{-13}$
Phenanthrene	NA	NA	NA
Pyrene	NA	NA	NA
<b>PATHWAY RISK</b>	$8 \times 10^{-6}$	$1 \times 10^{-14}$	$7 \times 10^{-8}$

<sup>a</sup> Hypothetical future workers were assumed to be exposed 8 hours/day, 5 days/week, 250 days/year, for 25 years (EPA, 1991a). Future workers were assumed to be exposed to soil COPCs in surface soils samples collected facility-wide (n = 20).

<sup>b</sup> An slope factor is not available for that chemical; hence, a cancer risk estimate cannot be calculated.

<sup>c</sup> Chromium VI was assumed to be 1% of total measured chromium (see Section 5.1).

**TABLE 5-10**  
**CUMULATIVE EXCESS LIFETIME CANCER RISKS FOR FUTURE**  
**WORKERS AND COMPLETE EXPOSURE PATHWAYS**  
**ASSUMING REASONABLE MAXIMUM EXPOSURES**

	Pathway Risk Estimate for the Worker Using Site- Specific Exposure Data	Pathway Risk Estimate for the Future Worker Using Standard Default Exposure Data <sup>a</sup>
<b>PATHWAY</b>		
Incidental Ingestion of Soil	$6 \times 10^{-7}$ (97%) <sup>b</sup>	$8 \times 10^{-6}$ (99%)
Dermal Contact with Soil	$3 \times 10^{-15}$ (<1%)	$1 \times 10^{-14}$ (<1%)
Inhalation of Particulates	$2 \times 10^{-8}$ (3%)	$7 \times 10^{-8}$ (1%)
<b>CUMULATIVE RISK</b>	$6 \times 10^{-7}$	$8 \times 10^{-6}$

<sup>a</sup> See Table 5-9.

<sup>b</sup> See Table 5-11.

<sup>b</sup> Percent contribution of that pathway to cumulative risk.

**TABLE 5-11  
CHEMICAL-SPECIFIC HAZARD QUOTIENTS AND CUMULATIVE HAZARD INDICES  
FOR THE HYPOTHETICAL FUTURE WORKER USING SITE-SPECIFIC EXPOSURE  
ASSUMPTIONS<sup>a</sup>**

Chemical	Incidental Ingestion Of Soil	Dermal Contact with Soil	Inhalation of Particulates
<b>METALS</b>			
Antimony	0.006	$1 \times 10^{-11}$	NA <sup>b</sup>
Beryllium	$4 \times 10^{-5}$	$7 \times 10^{-14}$	NA
Cadmium	0.002	$4 \times 10^{-12}$	NA
Chromium (total)	$2 \times 10^{-4}$	$3 \times 10^{-13}$	NA
Chromium VI <sup>c</sup>	$8 \times 10^{-5}$	$6 \times 10^{-13}$	NA
Copper	$2 \times 10^{-4}$	$3 \times 10^{-13}$	NA
Lead	NA	NA	NA
Mercury	$1 \times 10^{-4}$	$2 \times 10^{-13}$	$8 \times 10^{-7}$
Selenium	$3 \times 10^{-5}$	$5 \times 10^{-14}$	NA
Silver	$6 \times 10^{-5}$	$1 \times 10^{-13}$	NA
Zinc	$2 \times 10^{-4}$	$3 \times 10^{-13}$	NA
<b>ORGANICS</b>			
Benzo(a)anthracene	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA
Benzo(b)fluoranthene	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	NA
Chrysene	NA	NA	NA
1,1-Dichloroethylene	$7 \times 10^{-8}$	$7 \times 10^{-13}$	NA
Fluoranthene	$7 \times 10^{-6}$	$2 \times 10^{-13}$	NA
Hexachlorobenzene	$4 \times 10^{-4}$	$3 \times 10^{-12}$	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA
Methylene chloride	$7 \times 10^{-9}$	$6 \times 10^{-16}$	$1 \times 10^{-12}$
Phenanthrene	NA	NA	NA
Pyrene	$4 \times 10^{-5}$	$2 \times 10^{-13}$	NA
<b>PATHWAY HI</b>	<b>0.01</b>	<b><math>2 \times 10^{-11}</math></b>	<b><math>8 \times 10^{-7}</math></b>

<sup>a</sup> Hypothetical future workers were assumed to be exposed 8 hours/day, 5 days/week, 250 days/year, for 8 years. Future workers were assumed to be exposed to COPCs in surface soil samples collected facility-wide (n = 20).

<sup>b</sup> An oral reference dose is not available for that chemical; hence, a hazard quotient cannot be calculated.

<sup>c</sup> Chromium VI was assumed to be 1% total measured chromium (see Section 5.1).



**TABLE 5-12**  
**CHEMICAL-SPECIFIC AND CUMULATIVE EXCESS LIFETIME CANCER RISK**  
**ESTIMATES FOR THE HYPOTHETICAL FUTURE WORKER USING SITE-SPECIFIC**  
**EXPOSURE ASSUMPTIONS<sup>a</sup>**

Chemical	Incidental Ingestion of Soil	Dermal Contact with Soil	Inhalation of Particulates
<b>METALS</b>			
Antimony	NA <sup>b</sup>	NA	NA
Beryllium	$1 \times 10^{-7}$	$2 \times 10^{-16}$	$5 \times 10^{-10}$
Cadmium	NA	NA	$3 \times 10^{-9}$
Chromium (total)	NA	NA	NA
Chromium VI <sup>c</sup>	NA	NA	$2 \times 10^{-8}$
Copper	NA	NA	NA
Lead	NA	NA	NA
Mercury	NA	NA	NA
Selenium	NA	NA	NA
Silver	NA	NA	NA
Zinc	NA	NA	NA
<b>ORGANICS</b>			
Benzo(a)anthracene	$2 \times 10^{-8}$	$6 \times 10^{-16}$	$1 \times 10^{-10}$
Benzo(a)pyrene	$3 \times 10^{-7}$	$1 \times 10^{-15}$	$3 \times 10^{-10}$
Benzo(b)fluoranthene	$2 \times 10^{-8}$	$3 \times 10^{-16}$	$6 \times 10^{-11}$
Benzo(k)fluoranthene	$2 \times 10^{-8}$	$2 \times 10^{-16}$	$5 \times 10^{-11}$
Chrysene	$7 \times 10^{-10}$	$2 \times 10^{-18}$	$5 \times 10^{-13}$
1,1-Dichloroethylene	$4 \times 10^{-11}$	$4 \times 10^{-18}$	$3 \times 10^{-14}$
Fluoranthene	NA	NA	NA
Hexachlorobenzene	$5 \times 10^{-8}$	$5 \times 10^{-16}$	$4 \times 10^{-10}$
Indeno(1,2,3-cd)pyrene	$1 \times 10^{-7}$	$3 \times 10^{-16}$	$5 \times 10^{-11}$
Methylene chloride	$3 \times 10^{-13}$	$3 \times 10^{-20}$	$2 \times 10^{-13}$
Phenanthrene	NA	NA	NA
Pyrene	NA	NA	NA
<b>PATHWAY RISK</b>	$6 \times 10^{-7}$	$3 \times 10^{-15}$	$2 \times 10^{-8}$

<sup>a</sup> Hypothetical future workers were assumed to be exposed 8 hours/day, 5 days/week, 250 days/year, for 8 years. Future workers were assumed to be exposed to COPCs in surface soil facility-wide (n = 20).

<sup>b</sup> An slope factor is not available for that chemical; hence, a cancer risk estimate cannot be calculated.

<sup>c</sup> Chromium VI was assumed to be 1% of total measured chromium (see Section 5.1).

**TABLE 5-13**  
**CUMULATIVE EXCESS LIFETIME CANCER RISKS FOR FUTURE WORKERS**  
**ASSUMING AVERAGE EXPOSURE CONDITIONS**

	Pathway Risk Estimate for the Future Worker Using Standard Default Exposure Data
<b>PATHWAY</b>	
Incidental Ingestion of Soil	$3 \times 10^{-6}$ (>99%)
Dermal Contact with Soil	$1 \times 10^{-15}$ (<1%)
Inhalation of Particulates	$6 \times 10^{-9}$ (<1%)
<b>CUMULATIVE RISK</b>	$3 \times 10^{-6}$

\* Percent contribution of that pathway to cumulative risk.

## 6.0 QUALITATIVE UNCERTAINTY ANALYSIS

Uncertainty analysis generally involves a qualitative discussion of the logic that leads to the selection and rejection of specific data, estimates, exposure factors and scenarios, and toxicity parameters (USEPA, 1992a). Reasons for addressing uncertainties in risk assessments include:

- Uncertain information from different sources of different quality must be combined.
- Best estimates for exposure parameters frequently are inaccurate due to incomplete data for site-specific human behavioral patterns.
- Parameter uncertainty (i.e., default values may be significantly over or underestimate a true site-specific value).
- Sampling errors; i.e., small data sets may over or under estimate the true value.

The major assumptions used in the HHRA are:

- Contaminant concentrations remain constant over the exposure period.
- Exposures remain constant over time.
- Selected intake rates and population characteristics used in this assessment (weight, lifespan, ingestion rates, etc.) are representative of the potentially exposed populations.

The general sources of uncertainty associated with this assessment and the effect that these sources may have on estimated risks are outlined in Table 6-1.

The following limitations and assumptions summarize the principal areas of uncertainty associated with the conclusions of the assessment of carcinogenic and non-carcinogenic health impacts from potential exposure to contamination at the CWMCS Chicago facility:

- The principal sources of uncertainty associated with this exposure assessment stem from the conservative assumptions used to model the RME and average scenarios. It was assumed that current upper-bound and mean environmental concentrations were representative of the range of concentrations to which individuals are likely to be exposed. Since receptor-point concentrations cannot be precisely determined, these two scenarios were used to provide decision makers with a broader perspective on the true range of risks likely to be encountered by exposure to COPCs.
- In the evaluation of current and future exposures to contaminants, we assumed the environmental concentrations did not decrease over time. It was assumed that 100% of the current concentrations (either the upper-bound or mean concentrations) were available for exposure.
- The CSFs values used in this assessment are very conservative. As noted earlier, CSFs represent an upper-bound estimate of the probability that individual exposed to contaminants over a lifetime will develop cancer. This means that the true risks associated with exposure to contaminants at the CWMCS facility are certainly no greater than the estimated risk, perhaps as low as zero (EPA, 1992a).
- In general, RfD values represent an estimate of a chemical's potential toxicity with an uncertainty spanning one order of magnitude. RfDs may overestimate risk from soil ingestion due to the lower bioavailability of COPCs in soil versus toxicological testing matrices (e.g., corn oil, water).
- Uncertainties associated with identifying chemicals of concern include those connected with sampling environmental media and those related to the use of small data sets in the statistical evaluation of data.
- The concentration of surface soil COPCs in air have been over-estimated. The approach outlined in Section 3.3.2 is conservative, since it assumes that all particulate matter in air above the site contains site-related chemicals only, and ignores precipitation and frozen soil conditions. Hence, the actual concentration of chemicals in air is expected to be substantially lower than the predicted concentration obtained using this approach.
- Another potentially significant source of uncertainty is the lack of toxicity constants for all COPCs, particularly inhalation values. An inhalation RfC was available for only two of the COPCs for surface soils. This lack of toxicity data could underestimate risks, although this may not be substantial. Oral RfDs and inhalation RfCs are not available for the following PAHs: benzo(a)anthracene, BaP, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, indeno(1,2,3-cd)pyrene, and phenanthrene. On the other hand, the inhalation pathway did not appear to be a major pathway of exposure. Similarly, the lack of oral RfDs and

CSFs could underestimate risks, although the magnitude of this source of uncertainty cannot be quantified.

- Health effects associated with exposure to lead were not evaluated in the same fashion as the other COPCs due to a lack of USEPA-approved slope factors and reference doses.

**TABLE 6-1**  
**General Uncertainty Factors**  
**- Continued -**

Uncertainty Factor	Effect of Uncertainty	Comment
Animal-to-human extrapolations	Could conservatively over- or underestimate risk by two orders of magnitude (Cothorn <i>et al.</i> 1985)	Assumes that the bioavailability of a specific chemical in an animal test species administered via a specific route is identical to the bioavailability of that chemical in humans if administered by the same route.
Exposure assumptions.	May over- or underestimate risks.	Assumptions regarding media intake, population characteristics, and exposure patterns may not accurately characterize exposures.
Exposures assumed constant over time.	May over- or underestimate risks.	Does not account for environmental fate, transport, or transfer that may alter concentration.

**TABLE 6-1**  
**GENERAL UNCERTAINTY FACTORS**

<b>Uncertainty Factor</b>	<b>Effect of Uncertainty</b>	<b>Comment</b>
Use of cancer slope factors.	May overestimate risks by an order of magnitude (Cothorn <i>et al.</i> , 1985)	Slopes are upper 95th percent confidence limits derived from the linearized model. Considered unlikely to underestimate true risk.
Risks/doses within an exposure route assumed to be additive.	May over- or underestimate risks.	Does not account for synergism or antagonism.
Toxicity values derived primarily from animal studies.	May over- or underestimate risks.	Extrapolation from animal to humans may induce error due to differences in pharmacokinetics, target organs, and population variability.
Toxicity values derived primarily from high doses; most exposures are at low doses.	May over- or underestimate risks.	Assumes linearity at low doses. Tends to have conservative exposure assumptions.
Toxicity values.	May over- or underestimate risks.	Not all values represent the same degree of certainty. All are subject to change as new evidence becomes available.
Not all chemicals at the site have toxicity values.	May underestimate risks.	These chemicals are not addressed quantitatively.
Chemicals of potential concern could act synergistically or antagonistically	May over- or underestimate by orders of magnitude (Cothorn <i>et al.</i> , 1985)	The assumption that all non-carcinogenic chemicals of potential concern act additively may not accurately reflect chemical toxicological interactions.

## 7.0 REFERENCES

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# CHEMWASTE BASELINE RISK ASSESSMENT - VERSION II

## CONCENTRATION OF METALS IN SURFACE SOILS SITE-WIDE (ug/kg micrograms per kilogram)

- DATA FROM VALIDATION REPORTS (APPENDIX X) WERE GIVEN PRIMACY.
- ETC ORIGINAL LABORATORY REPORTS WERE CONSULTED FOR RESOLUTION OF BMDL VALUES.
- BMDL VALUES WERE ASSUMED TO BE EQUAL TO ONE-HALF THE SAMPLE QUANTITTATION LIMIT.
- NON-DETECTS EQUAL TO ONE-HALF THE SQL (ug/kg = micrograms per kilogram)
- ALL DATA WERE COLLECTED DURING PHASE II INVESTIGATIONS.
- DATA FOR SAMPLES S-11, S-12, AND S-13 WERE NOT USED IN THE RISK ASSESSMENT BUT ARE INCLUDED IN APPENDIX K.

	Antimony	Arsenic	Beryllium	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Selenium	Silver	Thallium	Zinc
SS-1	3500	5900	1200	4000	110000	43000	120000	120	20000	600	1200	600	251000
SS-2	3400	1100	2000	13000	968000	32000	39000	110	12000	1450	3500	550	67000
SS-3	23000	2600	1300	12000	1060000	36000	43000	47	26000	600	3300	600	81000
SS-4	3750	1300	1600	12000	1320000	52000	32000	50	12000	1600	3000	650	67000
SS-5	22000	2500	1300	12000	740000	44000	92000	110	14000	900	2400	1200	110000
SS-6	9500	7200	1500	4700	184000	49000	260000	150	24000	345	700	700	481000
SS-7	4700	30000	990	4200	92000	60000	200000	260	32000	390	800	800	220000
SS-8	5000	5100	710	2500	34000	34000	120000	160	19000	850	850	850	150000
SS-9	4150	15000	850	3400	44000	67000	140000	230	33000	700	700	700	514000
SS-10	3750	5400	1900	1700	27000	23000	44000	110	17000	315	650	650	81000
SS-14	19000	2100	1300	12000	864000	38000	48000	120	11000	550	2700	550	92000
SS-15	22000	1100	1400	10000	1060000	35000	41000	120	140000	550	3400	550	100000
SS-16	3450	1200	1500	55700	600000	78000	68000	46	71000	1450	3700	600	110000
SS-17	3550	3700	3400	3800	126000	43000	100000	150	17000	1500	600	600	220000
SS-18	9100	22000	2000	12000	803000	44000	66000	440	13000	600	2300	600	130000
SS-19	3650	18000	860	3300	42000	54000	290000	540	26000	1550	600	600	293000
SS-20	3550	4400	360	1500	8900	15000	11000	47	15000	295	600	600	40000
SS-21	3600	600	270	540	29000	16000	45000	250	7500	300	600	600	82000
SS-22	90000	4300	690	5000	157000	54000	1260000	130	11000	335	650	650	1570000
SS-23	5500	9600	2000	4300	57000	32000	270000	230	13000	440	900	900	744000
Min	3400.0	600.0	270.0	540.0	8900.0	15000.0	11000.0	46.0	7500.0	295.0	600.0	550.0	40000.0
Max	90000.0	30000.0	3400.0	55700.0	1320000.0	78000.0	1260000.0	540.0	140000.0	1600.0	3700.0	1200.0	1570000
Mean	12307.5	7155.0	1356.5	8882.0	416295.0	42450.0	164450.0	171.0	26675.0	766.0	1657.5	677.5	270150.0
STD	19616.7	8006.5	708.0	11835.5	450975.4	15925.7	271412.4	128.2	30030.8	472.6	1206.6	156.8	356334.4
n	20	20	20	20	20	20	20	20	20	20	20	20	20
UCL	19891.6	10250.4	1630.2	13457.8	590649.4	48607.1	269382.4	220.6	38285.4	948.7	2124.0	738.1	407914.7
%DET	85	100	100	100	100	100	100	90	100	60	100	30	100

CONCENTRATION OF ORGANICS IN SITE SURFACE SOILS SITE-WIDE (Mg/kg)

- DATA FROM VALIDATION REPORTS (APPENDIX X) WERE GIVEN PRIMACY.
- ETC ORIGINAL LABORATORY REPORTS WERE CONSULTED FOR RESOLUTION OF BMDL VALUES.
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	BA	BaP	B(b)Fl	B(k)Fl	Chrysene	Flouranth	HCB	I(123)P	Phenanthr	Pyrene	MC	BEHP	Di-n-BP	1,1-DCE	TCE
SS-1	1744	1450	2800	1450	1730	2910	1100	2150	1910	2480	1.65	6000	3209	1.65	1.1
SS-2	220	140	255	140	303	373	110	210	289	351	1.6	335	1680	1.6	1.1
SS-3	404	305	606	314	524	833	115	220	1330	1010	1.65	276	2020	18.5	1.98
SS-4	495	463	916	386	620	804	120	230	398	769	1.75	650	4000	1.75	1.2
SS-5	1020	998	1240	762	1250	1960	275	529	1020	2010	1.65	302	1530	1.7	1.1
SS-6	5500	1700	3300	1700	2360	4120	1300	2550	3180	3410	1.9	7000	7080	1.9	1.3
SS-7	6000	1950	3750	1950	1950	2640	1500	2900	2400	2200	2.2	8000	2440	2.2	1.5
SS-8	4500	2100	7550	2100	5770	9380	1600	3100	7733	7750	2.35	8500	850	R	R
SS-9	2068	1700	3300	1700	2530	5320	1300	2550	4082	4520	1.9	8400	793	1.9	1.3
SS-10	4900	1550	3000	1550	1550	1740	3100	2300	3400	2050	1.75	6500	6500	1.75	3.7
SS-14	195	145	275	145	264	354	110	215	194	332	1.6	325	1130	1.6	1.1
SS-15	445	140	251	140	219	244	110	210	124	211	1.6	295	1750	14.3	1.1
SS-16	261	328	448	145	374	489	110	215	234	425	11	329	2120	1.6	1.1
SS-17	1040	1280	2450	1090	1230	1720	110	914	1010	1560	1.65	600	1810	1.65	1.1
SS-18	4600	1450	3360	1740	1740	1282	1100	2580	1410	1576	1.65	7200	2588	1.65	1.1
SS-19	3630	2760	3700	2230	4100	7870	132	2250	5012	6570	3.95	7200	1230	1.7	1.15
SS-20	550	170	330	170	170	150	130	255	370	132	1.9	720	1340	1.9	1.3
SS-21	4650	1500	2940	1500	1500	1300	1150	2200	19105	2250	1.65	6000	6000	1.65	1.15
SS-22	2590	1650	3200	1650	2800	5070	1250	2450	5100	4000	1.85	404000	3600	5	1.25
SS-23	2650	2175	4200	2200	3000	6070	1650	3250	6120	5180	2.45	9000	3320	2.45	1.65
Min	195.0	140.0	251.0	140.0	170.0	150.0	110.0	210.0	124.0	132.0	1.6	276.0	793.0	1.7	1.1
Max	6000.0	2760.0	7550.0	2230.0	5770.0	9380.0	3100.0	3250.0	19105.0	3.0	11.000	404000.0	7080.0	18.5	3.7
Mean	2373.1	1197.7	2393.6	1153.1	1699.2	2731.5	818.6	1563.9	3221.1	2439.3	2.385	24081.6	2749.5	3.5	1.4
STD	2027.1	806.9	1861.9	789.5	1446.5	2705.3	815.1	1183.4	4352.4	2181.4	2.1	89493.9	1865.6	4.7	0.7
n	20	20	20	20	20	20	20	20	20	20	20	20	20	19	19
UCL	3156.80	1509.65	3113.39	1458.35	2258.45	3777.37	1133.73	2021.42	4903.77	3282.68	3.20	58681.40	3470.76	5.38	1.66
%DET	65	30	45	25	75	95	10	10	90	95	11	35	80	10	11

R = Data were judged to be unreliable in the data validation process and were not used in risk calculations.

**APPENDIX A**  
**ANALYTICAL DATA USED TO CALCULATE**  
**EXPOSURE POINT CONCENTRATIONS**

## CHEMWASTE BASELINE RISK ASSESSMENT - VERSION II

## CONCENTRATION OF METALS IN SURFACE SOILS SITE-WIDE (ug/kg micrograms per kilogram)

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Min	3400.0	600.0	270.0	540.0	8900.0	15000.0	11000.0	46.0	7500.0	295.0	600.0	550.0	40000.0
Max	90000.0	30000.0	3400.0	55700.0	1320000.0	78000.0	1260000.0	540.0	140000.0	1600.0	3700.0	1200.0	1570000
Mean	12307.5	7155.0	1356.5	8882.0	416295.0	42450.0	164450.0	171.0	26675.0	766.0	1657.5	677.5	270150.0
STD	19616.7	8006.5	708.0	11835.5	450975.4	15925.7	271412.4	128.2	30030.8	472.6	1206.6	156.8	356334.4
n	20	20	20	20	20	20	20	20	20	20	20	20	20
UCL	19891.6	10250.4	1630.2	13457.8	590649.4	48607.1	269382.4	220.6	38285.4	948.7	2124.0	738.1	407914.7
%DET	85	100	100	100	100	100	100	90	100	60	100	30	100



CONCENTRATION OF ORGANICS IN SITE SURFACE SOILS SITE-WIDE (Mg/kg)

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SS-6	5500	1700	3300	1700	2360	4120	1300	2550	3180	3410	1.9	7000	7080	1.9	1.3
SS-7	6000	1950	3750	1950	1950	2640	1500	2900	2400	2200	2.2	8000	2440	2.2	1.5
SS-8	4500	2100	7550	2100	5770	9380	1600	3100	7733	7750	2.35	8500	850	R	R
SS-9	2068	1700	3300	1700	2530	5320	1300	2550	4082	4520	1.9	8400	793	1.9	1.3
SS-10	4900	1550	3000	1550	1550	1740	3100	2300	3400	2050	1.75	6500	6500	1.75	3.7
SS-14	195	145	275	145	264	354	110	215	194	332	1.6	325	1130	1.6	1.1
SS-15	445	140	251	140	219	244	110	210	124	211	1.6	295	1750	14.3	1.1
SS-16	261	328	448	145	374	489	110	215	234	425	11	329	2120	1.6	1.1
SS-17	1040	1280	2450	1090	1230	1720	110	914	1010	1560	1.65	600	1810	1.65	1.1
SS-18	4600	1450	3360	1740	1740	1282	1100	2580	1410	1576	1.65	7200	2588	1.65	1.1
SS-19	3630	2760	3700	2230	4100	7870	132	2250	5012	6570	3.95	7200	1230	1.7	1.15
SS-20	550	170	330	170	170	150	130	255	370	132	1.9	720	1340	1.9	1.3
SS-21	4650	1500	2940	1500	1500	1300	1150	2200	19105	2250	1.65	6000	6000	1.65	1.15
SS-22	2590	1650	3200	1650	2800	5070	1250	2450	5100	4000	1.85	404000	3600	5	1.25
SS-23	2650	2175	4200	2200	3000	6070	1650	3250	6120	5180	2.45	9000	3320	2.45	1.65
Min	195.0	140.0	251.0	140.0	170.0	150.0	110.0	210.0	124.0	132.0	1.6	276.0	793.0	1.7	1.1
Max	6000.0	2760.0	7550.0	2230.0	5770.0	9380.0	3100.0	3250.0	19105.0	3.0	11.000	404000.0	7080.0	18.5	3.7
Mean	2373.1	1197.7	2393.6	1153.1	1699.2	2731.5	818.6	1563.9	3221.1	2439.3	2.385	24081.6	2749.5	3.5	1.4
STD	2027.1	806.9	1861.9	789.5	1446.5	2705.3	815.1	1183.4	4352.4	2181.4	2.1	89493.9	1865.6	4.7	0.7
n	20	20	20	20	20	20	20	20	20	20	20	20	20	19	19
UCL	3156.80	1509.65	3113.39	1458.35	2258.45	3777.37	1133.73	2021.42	4903.77	3282.68	3.20	58681.40	3470.76	5.38	1.66
%DET	65	30	45	25	75	95	10	10	90	95	11	35	80	10	11

R = Data were judged to be unreliable in the data validation process and were not used in risk calculations.

CONCENTRATION OF METALS IN SURFACE SOILS INSIDE THE FENCE (ug/kg)

- DATA FROM VALIDATION REPORTS (APPENDIX X) WERE GIVEN PRIMACY.
- ETC ORIGINAL LABORATORY REPORTS WERE CONSULTED FOR RESOLUTION OF BMDL VALUES.
- BMDL VALUES WERE ASSUMED TO BE EQUAL TO ONE-HALF THE SAMPLE QUANTITATION LIMIT.
- NON-DETECTS EQUAL TO ONE-HALF THE SQL (ug/kg = micrograms per kilogram)
- ALL DATA WERE COLLECTED DURING PHASE II INVESTIGATIONS.
- DATA FOR SAMPLES S-11, S-12, AND S-13 WERE NOT USED IN THE RISK ASSESSMENT BUT ARE INCLUDED IN APPENDIX K.

	Antimony	Arsenic	Beryllium	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Selenium	Silver	Thallium	Zinc
SS-1	3500	5900	1200	4000	110000	43000	120000	120	20000	600	1200	600	251000
SS-2	3400	1100	2000	13000	968000	32000	39000	110	12000	1450	3500	550	67000
SS-3	23000	2600	1300	12000	1060000	36000	43000	47	26000	600	3300	600	81000
SS-4	3750	1300	1600	12000	1320000	52000	32000	50	12000	1600	3000	650	67000
SS-5	22000	2500	1300	12000	740000	44000	92000	110	14000	900	2400	1200	110000
SS-14	19000	2100	1300	12000	864000	38000	48000	120	11000	550	2700	550	92000
SS-15	22000	1100	1400	10000	1060000	35000	41000	120	140000	550	3400	550	100000
SS-16	3450	1200	1500	55700	600000	78000	68000	46	71000	1450	3700	600	110000
SS-17	3550	3700	3400	3800	126000	43000	100000	150	17000	1500	600	600	220000
SS-20	3550	4400	360	1500	8900	15000	11000	47	15000	295	600	600	40000
SS-21	3600	600	270	540	29000	16000	45000	250	7500	300	600	600	82000
Min	3400.0	600.0	270.0	540.0	8900.0	15000.0	11000.0	46.0	7500.0	295.0	600.0	550.0	40000.0
Max	23000.0	5900.0	3400.0	55700.0	1320000.0	78000.0	120000.0	250.0	140000.0	1600.0	3700.0	1200.0	251000.0
Mean	10072.7	2409.1	1420.9	12412.7	625990.9	39272.7	58090.9	106.4	31409.1	890.5	2272.7	645.5	110909.1
STD	9109.8	1653.8	826.7	15118.3	479489.9	17106.1	33004.4	60.8	40050.5	510.4	1270.5	186.4	65283.2
n	11	11	11	11	11	11	11	11	11	11	11	11	11
UCL	15049.8	3312.6	1872.5	20672.5	887954.7	48618.4	76122.5	139.6	53290.2	1169.3	2966.9	747.3	146575.8

CONCENTRATION OF ORGANICS IN SURFACE SOILS INSIDE THE FENCE (ug/kg)

	BA	BaP	B(b)Fl	B(k)Fl	Chrysene	Flouranth	HCB(a)	I(123)P	Phenanth	Pyrene	MC	BEHP	Di-n-BP	1,1-DCE	TCE
SS-1	1744	1450	2800	1450	1730	2910	0	2150	1910	2480	1.65	6000	3209	1.65	1.1
SS-2	220	140	255	140	303	373	0	210	289	351	1.6	335	1680	1.6	1.1
SS-3	404	305	606	314	524	833	0	220	1330	1010	1.65	276	2020	18.5	1.98
SS-4	495	463	916	386	620	804	0	230	398	769	1.75	650	4000	1.75	1.2
SS-5	1020	998	1240	762	1250	1960	275	529	1020	2010	1.65	302	1530	1.7	1.1
SS-14	195	145	275	145	264	354	0	215	194	332	1.6	325	1130	1.6	1.1
SS-15	445	140	251	140	219	244	0	210	124	211	1.6	295	1750	14.3	1.1
SS-16	261	328	448	145	374	489	0	215	234	425	11	329	2120	1.6	1.1
SS-17	1040	1280	2450	1090	1230	1720	0	914	1010	1560	1.65	600	1810	1.65	1.1
SS-20	550	170	330	170	170	150	130	255	370	132	1.9	720	1340	1.9	1.3
SS-21	4650	1500	2940	1500	1500	1300	1150	2200	19105	2250	1.65	6000	6000	1.65	1.15
Min	195.0	140.0	251.0	140.0	170.0	150.0	0.0	210.0	124.0	132.0	1.6	276.0	1130.0	1.6	1.1
Max	4650.0	1500.0	2940.0	1500.0	1730.0	2910.0	1150.0	2200.0	19105.0	2480.0	11.0	6000.0	6000.0	18.5	2.0
Mean	1002.2	629.0	1137.4	567.5	744.0	1012.5	141.4	668.0	2362.2	1048.2	2.5	1439.3	2417.2	4.4	1.2
STD	1296.2	560.3	1073.0	541.9	571.5	872.3	345.7	775.6	5582.0	876.8	2.8	2260.4	1455.2	6.0	0.3
n	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
UCL	1710.3	935.1	1723.6	863.5	1056.3	1489.0	330.2	1091.8	5411.8	1527.2	4.1	2674.2	3212.2	7.6	1.4

(a) Hexachlorobenzene was not detected in any of the eight samples collected inside the fence.

## CONTAMINANTS IN CLAY, PHASE II DATA ONLY, CWMCS CHICAGO INCINERATOR FACILITY

- DATA FROM VALIDATION REPORTS (APPENDIX X) WERE GIVEN PRIMACY.  
-- ETC ORIGINAL LABORATORY REPORTS WERE CONSULTED FOR RESOLUTION OF BMDL VALUES.  
-- BMDL VALUES WERE ASSUMED TO BE EQUAL TO ONE-HALF THE SAMPLE QUANTITATION LIMIT.  
-- NON-DETECTS EQUAL TO ONE-HALF THE SQL (ug/kg = micrograms per kilogram)

Sample	Antimony	Arsenic	Beryll	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Selenium	Silver	Thallium	Zinc	BEHP	TCE	Phenan.	Di-n-BP
C-4-5	3650	8500	690	3100	18000	21000	10000	49	25000	140	600	600	45000	41500	1.15	330	6910
C-4-15	3750	16000	380	3400	8600	42000	24000	50	29000	310	600	600	50000	650	2.1	340	4090
C-4-40	3350	11000	630	3400	15000	29000	31000	44.5	31000	280	550	550	59000	550	1.05	345	4460
C-6-5	3700	9600	660	3300	17000	32000	16000	49	34000	305	600	600	63000	550	1.14	295	4660
C-6-15	3500	16000	410	3700	8600	46000	23000	47	28000	295	600	600	81000	600	1.1	320	2840
C-6-40	3300	11000	570	3400	14000	34000	16000	44	30000	275	550	550	55000	550	1.05	295	2020
C-2-5	3550	6700	670	2900	17000	26000	13000	47.5	29000	295	600	600	54000	4810	1.1	320	6080
C-2-15	3600	15000	440	3500	9300	50000	20000	48	32000	300	600	600	90000	9410	1.15	429	6580
C-1-5	3650	8000	740	1400	18000	27000	14000	48.5	30000	305	600	600	48000	3870	1.15	325	2620
C-1-15	3850	2900	870	1500	23000	25000	13000	50	35000	325	650	650	56000	7690	1.24	350	4350
C-1-40	3450	11000	580	1900	14000	40000	21000	46	31000	290	600	1200	79000	7750	1.1	310	3070
C-7-15	3550	12000	580	1800	16000	40000	24000	47.5	37000	295	600	1700	66000	10800	1.1	320	4250
C-7-40	3350	8900	720	1800	17000	29000	21000	44.5	30000	280	550	1200	61000	7600	1.05	300	8240
C-3-5	3600	9800	740	1800	17000	49000	23000	48	41000	300	600	600	58000	6140	1.15	320	9540
C-3-15	3500	13000	740	2000	17000	42000	24000	47	40000	295	600	1500	100000	7370	1.1	315	1900
C-3-40	3300	9400	560	1800	13000	38000	21000	44	32000	275	550	550	64000	3870	1.05	295	17600
C-7-5	3650	8200	730	1900	18000	27000	16000	48.5	31000	305	600	600	56000	11000	1.15	330	3970
C-5-5	3600	5100	760	1500	19000	23000	13000	100	27000	300	600	600	48000	6640	1.15	320	3980
C-5-15	3550	18000	610	2000	11000	44000	22000	47.5	34000	295	600	1700	64000	4120	1.1	320	8510
C-5-40	3350	10000	580	1900	14000	34000	20000	44.5	31000	280	550	550	80000	4450	1.05	300	15200
C-2R-5	3650	5800	690	2800	18000	23000	14000	48.5	28000	600	600	600	46000	512	1.15	155	4300
C-2R-15	3800	13000	350	2900	7700	37000	21000	50	23000	1600	650	650	53000	512	3.15	272	2690
C-2R-40	3400	11000	460	7100	10000	36000	49000	45	41000	1400	550	550	53000	337	47.9	264	5810
Min	3300.0	2900.0	350.0	1400.0	7700.0	21000.0	10000.0	44.0	23000.0	140.0	550.0	550.0	45000.0	337.0	1.1	155.0	1900.0
Max	3850.0	18000.0	870.0	7100.0	23000.0	50000.0	49000.0	100.0	41000.0	1600.0	650.0	1700.0	100000.0	41500.0	47.9	429.0	17600.0
Mean	3550.0	10430.4	615.7	2643.5	14791.3	34521.7	20391.3	49.5	31695.7	406.3	591.3	780.4	62130.4	6142.7	3.3	311.7	5811.7
STD	157.4	3673.9	135.6	1238.0	3998.3	8675.3	7975.8	11.2	4704.3	354.1	28.8	382.5	14586.1	8490.3	9.7	46.7	3941.2
n	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23
UCL	3606.2	11741.9	664.1	3085.4	16218.6	37618.6	23238.5	53.5	33375.0	532.7	601.6	917.0	67337.3	9173.5	6.8	328.4	7218.7
%DET	4	100	100	100	100	100	100	48	100	65	65	74	100		11	39	100

CONTAMINANTS IN CLAY, PHASE II DATA ONLY, CWMCS CHICAGO INCINERATOR FACILITY

- DATA FROM VALIDATION REPORTS (APPENDIX X) WERE GIVEN PRIMACY.
- ETC ORIGINAL LABORATORY REPORTS WERE CONSULTED FOR RESOLUTION OF BMDL VALUES.
- BMDL VALUES WERE ASSUMED TO BE EQUAL TO ONE-HALF THE SAMPLE QUANTITATION LIMIT.
- NON-DETECTS EQUAL TO ONE-HALF THE SQL (ug/kg = micrograms per kilogram)

Sample	Antimony	Arsenic	Beryll	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Selenium	Silver	Thallium	Zinc	BEHP	TCE	Phenan.	Di-n-BP
C-4-5	3650	8500	690	3100	18000	21000	10000	49	25000	140	600	600	45000	41500	1.15	330	6910
C-4-15	3750	16000	380	3400	8600	42000	24000	50	29000	310	600	600	50000	650	2.1	340	4090
C-4-40	3350	11000	630	3400	15000	29000	31000	44.5	31000	280	550	550	59000	550	1.05	345	4460
C-6-5	3700	9600	660	3300	17000	32000	16000	49	34000	305	600	600	63000	550	1.14	295	4660
C-6-15	3500	16000	410	3700	8600	46000	23000	47	28000	295	600	600	81000	600	1.1	320	2840
C-6-40	3300	11000	570	3400	14000	34000	16000	44	30000	275	550	550	55000	550	1.05	295	2020
C-2-5	3550	6700	670	2900	17000	26000	13000	47.5	29000	295	600	600	54000	4810	1.1	320	6080
C-2-15	3600	15000	440	3500	9300	50000	20000	48	32000	300	600	600	90000	9410	1.15	429	6580
C-1-5	3650	8000	740	1400	18000	27000	14000	48.5	30000	305	600	600	48000	3870	1.15	325	2620
C-1-15	3850	2900	870	1500	23000	25000	13000	50	35000	325	650	650	56000	7690	1.24	350	4350
C-1-40	3450	11000	580	1900	14000	40000	21000	46	31000	290	600	1200	79000	7750	1.1	310	3070
C-7-15	3550	12000	580	1800	16000	40000	24000	47.5	37000	295	600	1700	66000	10800	1.1	320	4250
C-7-40	3350	8900	720	1800	17000	29000	21000	44.5	30000	280	550	1200	61000	7600	1.05	300	8240
C-3-5	3600	9800	740	1800	17000	49000	23000	48	41000	300	600	600	58000	6140	1.15	320	9540
C-3-15	3500	13000	740	2000	17000	42000	24000	47	40000	295	600	1500	100000	7370	1.1	315	1900
C-3-40	3300	9400	560	1800	13000	38000	21000	44	32000	275	550	550	64000	3870	1.05	295	17600
C-7-5	3650	8200	730	1900	18000	27000	16000	48.5	31000	305	600	600	56000	11000	1.15	330	3970
C-5-5	3600	5100	760	1500	19000	23000	13000	100	27000	300	600	600	48000	6640	1.15	320	3980
C-5-15	3550	18000	610	2000	11000	44000	22000	47.5	34000	295	600	1700	64000	4120	1.1	320	8510
C-5-40	3350	10000	580	1900	14000	34000	20000	44.5	31000	280	550	550	80000	4450	1.05	300	15200
C-2R-5	3650	5800	690	2800	18000	23000	14000	48.5	28000	600	600	600	46000	512	1.15	155	4300
C-2R-15	3800	13000	350	2900	7700	37000	21000	50	23000	1600	650	650	53000	512	3.15	272	2690
C-2R-40	3400	11000	460	7100	10000	36000	49000	45	41000	1400	550	550	53000	337	47.9	264	5810
Min	3300.0	2900.0	350.0	1400.0	7700.0	21000.0	10000.0	44.0	23000.0	140.0	550.0	550.0	45000.0	337.0	1.1	155.0	1900.0
Max	3850.0	18000.0	870.0	7100.0	23000.0	50000.0	49000.0	100.0	41000.0	1600.0	650.0	1700.0	*****	41500.0	47.9	429.0	17600.0
Mean	3550.0	10430.4	615.7	2643.5	14791.3	34521.7	20391.3	49.5	31695.7	406.3	591.3	780.4	62130.4	6142.7	3.3	311.7	5811.7
STD	157.4	3673.9	135.6	1238.0	3998.3	8675.3	7975.8	11.2	4704.3	354.1	28.8	382.5	14586.1	8490.3	9.7	46.7	3941.2
n	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23
UCL	3606.2	11741.9	664.1	3085.4	16218.6	37618.6	23238.5	53.5	33375.0	532.7	601.6	917.0	67337.3	9173.5	6.8	328.4	7218.7
%DET	4	100	100	100	100	100	100	48	100	65	65	74	100		11	39	100

RESULTS OF THE K-S TEST DONE ON A SAMPLE SIZE OF 11 (SAMPLES INSIDE THE FENCE)

Chemical	Parameter Distributi	Significan Level**	Number o Samples	Mean (mg/kg)	Standard Deviation (u	H or T statistic	95%UCL for Distribution
Antimony	none	0 (normal)	11	10072.73	9109.79	1.81	15049.75
Antimony	none	0.0 (logno	11	8.827	0.91	2.84	23342.27
Arsenic	lognormal	0.542	11	7.572	0.70	2.47	4285.28
Beryllium	normal	0.099	11	1420.909	826.66	1.81	1872.55
Cadmium	lognormal	0.052	11	8.848	1.25	3.51	60834.95
Chromiu	normal	0.173	11	625990.9	479489.88	1.81	887954.72
Copper	normal	0.206	11	39272.73	17106.09	1.81	48618.44
Lead	lognormal	0.422	11	10.8	0.66	2.41	100688.52
Mercury	normal	0.109	11	106.364	60.82	1.81	139.59
Nickel	lognormal	0.107	11	9.91	0.87	2.77	62688.89
Selenium	lognormal	0.173	11	6.623	0.63	2.37	1467.68
Silver	normal	0.461	11	2272.727	1270.51	1.81	2966.85
Thallium	none	0.0 (norm	11	645.455	186.35	1.81	747.27
Thallium	none	0.0 (logno	11	6.443	0.22	1.88	733.62
Zinc	lognormal	0.128	11	11.485	0.52	2.21	160473.42

RESULTS OF THE K-S TEST DONE ON A SAMPLE SIZE OF 11 (SAMPLES INSIDE THE FENCE)

Chemical	Parameter Distributi	Significan Level**	Number o Samples	Mean (mg/kg)	Standard Deviation (m	H or T statistic	95%UCL for Distribution
BA	lognormal	0.422	11	6.421	0.96	2.93	2356.72
BaP	lognormal	0.435	11	6.027	0.98	2.98	1699.51
B(b)Fl	lognormal	0.671	11	6.606	0.98	2.98	3016.96
B(k)Fl	lognormal	0.092	11	5.9	0.99	2.99	1515.58
Chrysene	lognormal	0.3	11	6.313	0.83	2.70	1585.98
Fluoranth	lognormal	1	11	6.553	0.94	2.89	2567.66
HCB	none	0.0 (norm	11	312.727	404.64	1.81	533.80
HCB	none	0.0 (logno	11	5.234	0.93	2.87	665.43
I(123)P	none	0.001 (nor	11	668	775.65	1.81	1091.76
I(123)P	none	0.001 (log	11	6.024	0.95	2.91	1542.39
Phenanthr	lognormal	0.36	11	6.506	1.41	3.87	10211.62
Pyrene	lognormal	0.842	11	6.546	1.02	3.05	3116.32
MC	none	0 (normal)	11	2.518	2.81	1.81	4.06
MC	none	0 (lognor	11	0.683	0.57	2.28	3.52
BEHP	none	0 (normal)	11	1439.273	2260.42	1.81	2674.23
BEHP	none	0.014 (log	11	6.479	1.15	3.31	4207.81
Di-n-BP	lognormal	0.106	11	7.663	0.50	2.18	3400.43
DCE	none	0 (normal)	11	4.355	6.03	1.81	7.65
DCE	none	0 (lognor	11	0.929	0.92	2.86	8.94
TCE	none	0.001 (nor	11	1.212	0.26	1.81	1.36
TCE	none	0.002 (log	11	0.176	0.18	1.85	1.34

RESULTS OF THE K-S TEST DONE ON A SAMPLE SIZE OF 20 (SAMPLES COLLECTED FACILITY-WIDE)

Chemical	Parameter Distributi	Significan Level**	Number o Samples	Mean (mg/kg)	Standard Deviation (u	H or T statistic	95%UCL for Distribution
Antimony	none	0 (normal)	20	12307.5	19616.66	1.73	19891.62
Antimony	none	0.002 (log	20	8.856	0.93	2.50	18394.24
Arsenic	lognormal	0.933	20	8.328	1.10	2.74	15058.24
Beryllium	normal	0.493	20	1356.5	707.96	1.73	1630.21
Cadmium	lognormal	0.354	20	8.595	1.01	2.61	16526.90
Chromiu	lognormal	0.055	20	12.044	1.56	3.46	1977241.40
Copper	normal	0.814	20	42450	15925.73	1.73	48607.15
Lead	lognormal	0.61	20	11.397	1.04	2.65	288498.23
Mercury	lognormal	0.081	20	4.91	0.70	2.21	246.75
Nickel	lognormal	0.327	20	9.894	0.68	2.19	35237.46
Selenium	lognormal	0.181	20	6.468	0.60	2.10	1028.77
Silver	none	0 (normal)	20	1657.5	1206.59	1.73	2123.99
Silver	none	0.007 (log	20	7.15	0.74	2.26	2463.56
Thallium	none	0.001 (nor	20	677.5	156.84	1.73	738.14
Thallium	none	0.002 (log	20	6.498	0.20	1.78	733.43
Zinc	lognormal	0.15	20	12.012	0.93	2.50	435219.86

RESULTS OF THE K-S TEST DONE ON A SAMPLE SIZE OF 20 (SAMPLES COLLECTED FACILITY-WIDE)

Chemical	Parameter Distributi	Significan Level**	Number o Samples	Mean (mg/kg)	Standard Deviation (m	H or T statistic	95%UCL for Distribution
BA	lognormal	0.299	20	7.243	1.19	2.87	6193.68
BaP	normal	0.12	20	1197.7	806.86	1.73	1509.65
B(b)Fl	normal	0.431	20	2393.55	1861.89	1.73	3113.39
B(k)Fl	none	0.042 (nor	20	1153.1	789.54	1.73	1458.35
B(k)Fl	none	0 (lognor	20	6.631	1.10	2.74	2773.49
Chrysene	normal	0.329	20	1699.2	1446.52	1.73	2258.45
Fluoranth	lognormal	1	20	7.342	1.21	2.90	7147.69
HCB	none	0.002 (nor	20	818.6	815.10	1.73	1133.73
HCB	none	0 (lognor	20	6.053	1.28	3.01	2322.52
I(123)P	none	0.004 (nor	20	1563.9	1183.39	1.73	2021.42
I(123)P	none	0 (lognor	20	6.859	1.17	2.85	4070.47
Phenanthr	lognormal	0.596	20	7.292	1.40	3.20	10918.64
Pyrene	lognormal	0.132	20	7.292	1.18	2.86	6354.01
MC	none	0 (normal)	20	2.385	2.10	1.73	3.20
MC	none	0 (lognor	20	0.719	0.45	1.98	2.79
BEHP	none	0 (normal)	20	24081.6	89493.94	1.73	58681.40
BEHP	none	0.005 (log	20	7.787	1.91	4.05	87644.44
Di-n-BP	lognormal	1	20	7.722	0.64	2.14	3791.19
DCE	none	0 (normal)	20	3.497	4.66	1.73	5.30
DCE	none	0 (lognor	20	0.863	0.73	2.24	4.50
TCE	none	0 (normal)	20	1.383	0.61	1.73	1.62
TCE	none	0 (lognor	20	0.27	0.30	1.84	1.55



# CHEMWASTE BASELINE RISK ASSESSMENT - VERSION II

## CONCENTRATION OF METALS IN SURFACE SOILS SITE-WIDE (Mg/kg micrograms per kilogram)

- DATA FROM VALIDATION REPORTS (APPENDIX X) WERE GIVEN PRIMACY.
- ETC ORIGINAL LABORATORY REPORTS WERE CONSULTED FOR RESOLUTION OF BMDL VALUES.
- BMDL VALUES WERE ASSUMED TO BE EQUAL TO ONE-HALF THE SAMPLE QUANTITATION LIMIT.
- NON-DETECT AND BMDL DATA POINTS ARE DESIGNATED WITH A "U" FLAG.
- NON-DETECT AND BMDL VALUES ARE ENTERED AS ONE-HALF THE SQL (ug/kg = micrograms per kilogram)

	Antimony	Arsenic	Beryllium	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Selenium	Silver	Thallium	Zinc
SS-1	3500	5900	1200	4000	110000	43000	120000	120	20000	600	1200	600	251000
SS-2	3400	1100	2000	13000	968000	32000	39000	110	12000	1450	3500	550 U	67000
SS-3	23000	2600	1300	12000	1060000	36000	43000	47	26000	600	3300	600 U	81000
SS-4	3750	1300	1600	12000	1320000	52000	32000	50	12000	1600 U	3000	650 U	67000
SS-5	22000	2500	1300	12000	740000	44000	92000	110	14000	900	2400	1200 U	110000
SS-6	9500	7200	1500	4700	184000	49000	260000	150	24000	345	700	700	481000
SS-7	4700 U	30000	990	4200	92000	60000	200000	260	32000	390	800	800	220000
SS-8	5000 U	5100	710	2500	34000	34000	120000	160	19000	850	850	850	150000
SS-9	4150 U	15000	850	3400	44000	67000	140000	230	33000	700	700	700	514000
SS-10	3750 U	5400	1900	1700	27000	23000	44000	110	17000	315	650	650	81000
SS-14	19000	2100	1300	12000	864000	38000	48000	120	11000	550	2700	550	92000
SS-15	22000	1100	1400	10000	1060000	35000	41000	120	140000	550	3400	550	100000
SS-16	3450 U	1200	1500	55700	600000	78000	68000	46 U	71000	1450 U	3700	600 U	110000
SS-17	3550	3700	3400	3800	126000	43000	100000	150	17000	1500	600	600	220000
SS-18	9100	22000	2000	12000	803000	44000	66000	440	13000	600	2300	600	130000
SS-19	3650 U	18000	860	3300	42000	54000	290000	540	26000	1550 U	600	600	293000
SS-20	3550	4400	360	1500	8900	15000	11000	47 U	15000	295	600	600	40000
SS-21	3600	600	270	540	29000	16000	45000	250	7500	300	600	600	82000
SS-22	90000	4300	690	5000	157000	54000	1260000	130	11000	335	650	650 U	1570000
SS-23	5500	9600	2000	4300	57000	32000	270000	230	13000	440	900	900 U	744000

CONCENTRATION OF ORGANICS IN SITE SURFACE SOILS SITE-WIDE (Mg/kg)

- DATA FROM VALIDATION REPORTS (APPENDIX X) WERE GIVEN PRIMACY.
- ETC ORIGINAL LABORATORY REPORTS WERE CONSULTED FOR RESOLUTION OF BMDL VALUES.
- BMDL VALUES WERE ASSUMED TO BE EQUAL TO ONE-HALF THE SAMPLE QUANTITATION LIMIT.
- NON-DETECT AND BMDL DATA POINTS ARE DESIGNATED WITH A "U" FLAG.
- NON-DETECT AND BMDL VALUES ARE ENTERED AS ONE-HALF THE SQL (ug/kg = micrograms per kilogram)

	BA	BaP	B(b)Fl	B(k)Fl	Chrysene	Flouranth	HCb	I(123)P	Phenanth	Pyrene	MC	BEHP	Di-n-BP	1,1-DCE	TCE
SS-1	1744	1450 U	2800 U	1450 U	1730	2910	1100 U	2150 U	1910	2480	1.65 U	6000 U	3209	1.65 U	1.1
SS-2	220	140 U	255	140 U	303	373	110 U	210 U	289	351	1.6 U	335	1680	1.6 U	1.1
SS-3	404	305	606	314	524	833	115 U	220 U	1330	1010	1.65 U	276	2020	18.5	1.98
SS-4	495	463	916	386	620	804	120 U	230 U	398	769	1.75 U	650 U	4000	1.75 U	1.2
SS-5	1020	998	1240	762	1250	1960	275	529	1020	2010	1.65 U	302	1530	1.7 U	1.1
SS-6	5500 U	1700 U	3300 U	1700 U	2360	4120	1300 U	2550 U	3180	3410	1.9 U	7000 U	7080 U	1.9 U	1.3
SS-7	6000 U	1950 U	3750 U	1950 U	1950 U	2640	1500 U	2900 U	2400	2200	2.2 U	8000 U	2440 U	2.2 U	1.5
SS-8	4500	2100 U	7550	2100 U	5770	9380	1600 U	3100 U	7733 U	7750	2.35 U	8500 U	850	R	R
SS-9	2068	1700 U	3300 U	1700 U	2530	5320	1300 U	2550 U	4082	4520	1.9 U	8400 U	793	1.9 U	1.3
SS-10	4900 U	1550 U	3000 U	1550 U	1550 U	1740	3100	2300 U	3400	2050	1.75 U	6500 U	6500 U	1.75 U	3.7
SS-14	195	145 U	275 U	145 U	264	354	110 U	215 U	194	332	1.6 U	325	1130	1.6 U	1.1
SS-15	445 U	140 U	251	140 U	219	244	110 U	210 U	124	211	1.6 U	295	1750	14.3	1.1
SS-16	261	328	448	145 U	374	489	110 U	215 U	234	425	11	329	2120	1.6 U	1.1
SS-17	1040	1280	2450	1090	1230	1720	110 U	914	1010	1560	1.65 U	600 U	1810	1.65 U	1.1
SS-18	4600 U	1450 U	3360 U	1740 U	1740 U	1282	1100 U	2580 U	1410	1576	1.65 U	7200 U	2588	1.65 U	1.1
SS-19	3630	2760	3700	2230	4100	7870	132 U	2250 U	5012	6570	3.95	7200 U	1230 U	1.7 U	1.15
SS-20	550 U	170 U	330 U	170 U	170 U	150	130 U	255 U	370 U	132	1.9 U	720 U	1340	1.9 U	1.3
SS-21	4650 U	1500 U	2940 U	1500 U	1500 U	1300 U	1150 U	2200 U	19105	2250	1.65 U	6000 U	6000 U	1.65 U	1.15
SS-22	2590	1650 U	3200 U	1650 U	2800	5070	1250 U	2450 U	5100	4000	1.85 U	404000	3600	5 U	1.25
SS-23	2650	2175 U	4200 U	2200 U	3000	6070	1650 U	3250 U	6120	5180	2.45 U	9000 U	3320	2.45 U	1.65

R = Data were judged to be unreliable in the data validation process and were not used in risk calculations.

CONTAMINANTS IN CLAY, PHASE II DATA ONLY, CWMCS CHICAGO INCINERATOR FACILITY

- DATA FROM VALIDATION REPORTS (APPENDIX X) WERE GIVEN PRIMACY.
- ETC ORIGINAL LABORATORY REPORTS WERE CONSULTED FOR RESOLUTION OF BMDL VALUES.
- BMDL VALUES WERE ASSUMED TO BE EQUAL TO ONE-HALF THE SAMPLE QUANTITTATION LIMIT.
- NON-DETECT AND BMDL DATA POINTS ARE DESIGNATED WITH A "U" FLAG.
- NON-DETECT AND BMDL VALUES ARE ENTERED AS ONE-HALF THE SQL (ug/kg = micrograms per kilogram)

Sample	Antimony	Arsenic	Beryll	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Selenium	Silver	Thallium	Zinc	BBHP	TCE	Phenan.	Di-n-BP
C-4-5	3650 U	8500	690	3100	18000	21000	10000	49 U	25000	140	600 U	600 U	45000	41500	1.15	330	6910
C-4-15	3750 U	16000	380	3400	8600	42000	24000	50 U	29000	310	600 U	600	50000	650	2.1	340	4090
C-4-40	3350 U	11000	630	3400	15000	29000	31000	44.5 U	31000	280	550	550	59000	550	1.05	345	4460
C-6-5	3700 U	9600	660	3300	17000	32000	16000	49 U	34000	305	600 U	600	63000	550	1.14	295	4660
C-6-15	3500 U	16000	410	3700	8600	46000	23000	47 U	28000	295	600	600	81000	600	1.1	320	2840
C-6-40	3300 U	11000	570	3400	14000	34000	16000	44 U	30000	275	550	550 U	55000	550	1.05	295	2020
C-2-5	3550 U	6700	670	2900	17000	26000	13000	47.5 U	29000	295 U	600	600	54000	4810	1.1	320	6080
C-2-15	3600 U	15000	440	3500	9300	50000	20000	48 U	32000	300	600 U	600	90000	9410	1.15	429	6580
C-1-5	3650 U	8000	740	1400	18000	27000	14000	48.5	30000	305	600	600 U	48000	3870	1.15	325	2620
C-1-15	3850 U	2900	870	1500	23000	25000	13000	50	35000	325	650	650	56000	7690	1.24	350	4350
C-1-40	3450 U	11000	580	1900	14000	40000	21000	46	31000	290	600	1200	79000	7750	1.1	310	3070
C-7-15	3550 U	12000	580	1800	16000	40000	24000	47.5	37000	295	600 U	1700	66000	10800	1.1	320	4250
C-7-40	3350 U	8900	720	1800	17000	29000	21000	44.5	30000	280	550	1200	61000	7600	1.05	300	8240
C-3-5	3600 U	9800	740	1800	17000	49000	23000	48	41000	300	600	600	58000	6140	1.15	320	9540
C-3-15	3500 U	13000	740	2000	17000	42000	24000	47 U	40000	295	600	1500	100000	7370	1.1	315	1900
C-3-40	3300 U	9400	560	1800	13000	38000	21000	44	32000	275 U	550	550	64000	3870	1.05	295	17600
C-7-5	3650 U	8200	730	1900	18000	27000	16000	48.5	31000	305 U	600	600	56000	11000	1.15	330	3970
C-5-5	3600 U	5100	760	1500	19000	23000	13000	100	27000	300	600	600 U	48000	6640	1.15	320	3980
C-5-15	3550 U	18000	610	2000	11000	44000	22000	47.5	34000	295	600	1700	64000	4120	1.1	320	8510
C-5-40	3350 U	10000	580	1900	14000	34000	20000	44.5	31000	280	550	550	80000	4450	1.05	300	15200
C-2R-5	3650	5800	690	2800	18000	23000	14000	48.5 U	28000	600	600	600	46000	512	1.15	155	4300
C-2R-15	3800 U	13000	350	2900	7700	37000	21000	50 U	23000	1600 U	650	650	53000	512	3.15	272	2690
C-2R-40	3400 U	11000	460	7100	10000	36000	49000	45	41000	1400 U	550	550	53000	337	47.9	264	5810

RESULTS OF THE K-S TEST DONE ON A SAMPLE SIZE OF 11 (SAMPLES INSIDE THE FENCE)

Chemical	Parameter Distributi	Significan Level**	Number o Samples	Mean (mg/kg)	Standard Deviation (u	H or T statistic	95%UCL for Distribution
Antimony	none	0 (normal)	11	10072.73	9109.79	1.81	15049.75
Antimony	none	0.0 (logno	11	8.827	0.91	2.84	23342.27
Arsenic	lognormal	0.542	11	7.572	0.70	2.47	4285.28
Beryllium	normal	0.099	11	1420.909	826.66	1.81	1872.55
Cadmium	lognormal	0.052	11	8.848	1.25	3.51	60834.95
Chromiu	normal	0.173	11	625990.9	479489.88	1.81	887954.72
Copper	normal	0.206	11	39272.73	17106.09	1.81	48618.44
Lead	lognormal	0.422	11	10.8	0.66	2.41	100688.52
Mercury	normal	0.109	11	106.364	60.82	1.81	139.59
Nickel	lognormal	0.107	11	9.91	0.87	2.77	62688.89
Selenium	lognormal	0.173	11	6.623	0.63	2.37	1467.68
Silver	normal	0.461	11	2272.727	1270.51	1.81	2966.85
Thallium	none	0.0 (norm	11	645.455	186.35	1.81	747.27
Thallium	none	0.0 (logno	11	6.443	0.22	1.88	733.62
Zinc	lognormal	0.128	11	11.485	0.52	2.21	160473.42

RESULTS OF THE K-S TEST DONE ON A SAMPLE SIZE OF 11 (SAMPLES INSIDE THE FENCE)

Chemical	Parameter Distributi	Significan Level**	Number o Samples	Mean (mg/kg)	Standard Deviation (m	H or T statistic	95%UCL for Distribution
BA	lognormal	0.422	11	6.421	0.96	2.93	2356.72
BaP	lognormal	0.435	11	6.027	0.98	2.98	1699.51
B(b)Fl	lognormal	0.671	11	6.606	0.98	2.98	3016.96
B(k)Fl	lognormal	0.092	11	5.9	0.99	2.99	1515.58
Chrysene	lognormal	0.3	11	6.313	0.83	2.70	1585.98
Fluoranth	lognormal	1	11	6.553	0.94	2.89	2567.66
HCB	none	0.0 (norm	11	312.727	404.64	1.81	533.80
HCB	none	0.0 (logno	11	5.234	0.93	2.87	665.43
I(123)P	none	0.001 (nor	11	668	775.65	1.81	1091.76
I(123)P	none	0.001 (log	11	6.024	0.95	2.91	1542.39
Phenanthr	lognormal	0.36	11	6.506	1.41	3.87	10211.62
Pyrene	lognormal	0.842	11	6.546	1.02	3.05	3116.32
MC	none	0 (normal)	11	2.518	2.81	1.81	4.06
MC	none	0 (lognor	11	0.683	0.57	2.28	3.52
BEHP	none	0 (normal)	11	1439.273	2260.42	1.81	2674.23
BEHP	none	0.014 (log	11	6.479	1.15	3.31	4207.81
Di-n-BP	lognormal	0.106	11	7.663	0.50	2.18	3400.43
DCE	none	0 (normal)	11	4.355	6.03	1.81	7.65
DCE	none	0 (lognor	11	0.929	0.92	2.86	8.94
TCE	none	0.001 (nor	11	1.212	0.26	1.81	1.36
TCE	none	0.002 (log	11	0.176	0.18	1.85	1.34

RESULTS OF THE K-S TEST DONE ON A SAMPLE SIZE OF 20 (SAMPLES COLLECTED FACILITY-WIDE)

Chemical	Parameter Distributi	Significan Level**	Number o Samples	Mean (mg/kg)	Standard Deviation (u	H or T statistic	95%UCL for Distribution
Antimony	none	0 (normal)	20	12307.5	19616.66	1.73	19891.62
Antimony	none	0.002 (log	20	8.856	0.93	2.50	18394.24
Arsenic	lognormal	0.933	20	8.328	1.10	2.74	15058.24
Beryllium	normal	0.493	20	1356.5	707.96	1.73	1630.21
Cadmium	lognormal	0.354	20	8.595	1.01	2.61	16526.90
Chromiu	lognormal	0.055	20	12.044	1.56	3.46	1977241.40
Copper	normal	0.814	20	42450	15925.73	1.73	48607.15
Lead	lognormal	0.61	20	11.397	1.04	2.65	288498.23
Mercury	lognormal	0.081	20	4.91	0.70	2.21	246.75
Nickel	lognormal	0.327	20	9.894	0.68	2.19	35237.46
Selenium	lognormal	0.181	20	6.468	0.60	2.10	1028.77
Silver	none	0 (normal)	20	1657.5	1206.59	1.73	2123.99
Silver	none	0.007 (log	20	7.15	0.74	2.26	2463.56
Thallium	none	0.001 (nor	20	677.5	156.84	1.73	738.14
Thallium	none	0.002 (log	20	6.498	0.20	1.78	733.43
Zinc	lognormal	0.15	20	12.012	0.93	2.50	435219.86

RESULTS OF THE K-S TEST DONE ON A SAMPLE SIZE OF 20 (SAMPLES COLLECTED FACILITY-WIDE)

Chemical	Parameter Distributi	Significan Level**	Number o Samples	Mean (mg/kg)	Standard Deviation (m	H or T statistic	95%UCL for Distribution
BA	lognormal	0.299	20	7.243	1.19	2.87	6193.68
BaP	normal	0.12	20	1197.7	806.86	1.73	1509.65
B(b)Fl	normal	0.431	20	2393.55	1861.89	1.73	3113.39
B(k)Fl	none	0.042 (nor	20	1153.1	789.54	1.73	1458.35
B(k)Fl	none	0 (lognor	20	6.631	1.10	2.74	2773.49
Chrysene	normal	0.329	20	1699.2	1446.52	1.73	2258.45
Fluoranth	lognormal	1	20	7.342	1.21	2.90	7147.69
HCB	none	0.002 (nor	20	818.6	815.10	1.73	1133.73
HCB	none	0 (lognor	20	6.053	1.28	3.01	2322.52
I(123)P	none	0.004 (nor	20	1563.9	1183.39	1.73	2021.42
I(123)P	none	0 (lognor	20	6.859	1.17	2.85	4070.47
Phenanthr	lognormal	0.596	20	7.292	1.40	3.20	10918.64
Pyrene	lognormal	0.132	20	7.292	1.18	2.86	6354.01
MC	none	0 (normal)	20	2.385	2.10	1.73	3.20
MC	none	0 (lognor	20	0.719	0.45	1.98	2.79
BEHP	none	0 (normal)	20	24081.6	89493.94	1.73	58681.40
BEHP	none	0.005 (log	20	7.787	1.91	4.05	87644.44
Di-n-BP	lognormal	1	20	7.722	0.64	2.14	3791.19
DCE	none	0 (normal)	20	3.497	4.66	1.73	5.30
DCE	none	0 (lognor	20	0.863	0.73	2.24	4.50
TCE	none	0 (normal)	20	1.383	0.61	1.73	1.62
TCE	none	0 (lognor	20	0.27	0.30	1.84	1.55

## EVALUATION OF CONTAMINANTS IN CLAY, PHASE II DATA ONLY, CWMCS CHICAGO INCINERATOR FACILITY

## VALIDATED DATA

METALS (Mg/kg = micrograms per kilogram)

Sample	Antimony	Arsenic	Beryll	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Selenium	Silver	Thallium	Zinc	BEHP	TCE	Phenanth.	Di-n-BP
C-4-5	3650	8500	690	3100	18000	21000	10000	49	25000	140	600	600	45000	41500	1.3	330	6910
C-4-15	3750	16000	380	3400	8600	42000	24000	50	29000	310	600	1000	50000	650	2.1	330	4660
C-4-40	3350	11000	630	3400	15000	29000	31000	44.5	31000	210	280	580	59000	550	1.05	345	4460
C-6-5	3700	9600	660	3300	17000	32000	16000	49	34000	140	600	500	63000	600	1.14	357.5	4090
C-6-15	3500	16000	410	3700	8600	46000	23000	47	28000	530	380	910	81000	600	1.14	330	2840
C-6-40	3300	11000	570	3400	14000	34000	16000	44	30000	150	240	710	55000	550	1.05	302.5	2020
C-2-5	3550	6700	670	2900	17000	26000	13000	47.5	29000	295	280	500	54000	7370	1.14	330	9540
C-2-15	3600	15000	440	3500	9300	50000	20000	48	32000	230	600	800	90000	3870	1.14	429	1900
C-1-5	3650	8000	740	1400	18000	27000	14000	68	30000	270	480	660	48000	11000	1.14	330	17600
C-1-15	3850	2900	870	1500	23000	25000	13000	62	35000	240	460	650	56000	6640	1.24	357.5	3970
C-1-40	3450	11000	580	1900	14000	40000	21000	74	31000	220	470	1200	79000	4120	1.05	290	3980
C-7-15	3550	12000	580	1800	16000	40000	24000	67	37000	140	430	1700	66000	4450	1.14	300	8510
C-7-40	3350	8900	720	1800	17000	29000	21000	53	30000	280	550	1200	61000		1.14	302.5	15200
C-3-5	3600	9800	740	1800	17000	49000	23000	48	41000	180	270	870	58000		1.14	270	1200
C-3-15	3500	13000	740	2000	17000	42000	24000	40	40000	260	390	1500	100000		1.05	330	
C-3-40	3300	9400	560	1800	13000	38000	21000	48	32000	250	390	890	64000		1.14	330	
C-7-5	3650	8200	730	1900	18000	27000	16000	68	31000	250	370	700	56000		1.14	330	
C-5-5	3600	5100	760	1500	19000	23000	13000	100	27000	180	290	500	48000		1.14	330	
C-5-15	3550	18000	610	2000	11000	44000	22000	57	34000	380	430	1700	64000		1.14	250	
C-5-40	3350	10000	580	1900	14000	34000	20000	54	31000	130	370	940	80000		1.14	330	
C-2R-5	1500	5800	690	2800	18000	23000	14000	48.5	28000	290	550	570	46000		1.14	155	
C-2R-15	3800	13000	350	2900	7700	37000	21000	50	23000	1600	640	980	53000		1.33	272	
C-2R-40	3400	11000	460	7100	10000	36000	49000	54	41000	1400	730	750	53000		47.9	264	
Min	1500.0	2900.0	350.0	1400.0	7700.0	21000.0	10000.0	40.0	23000.0	130.0	240.0	500.0	45000.0	550.0	1.1	155.0	1200.0
Max	3850.0	18000.0	870.0	7100.0	23000.0	50000.0	49000.0	100.0	41000.0	1600.0	730.0	1700.0	100000.0	41500.0	47.9	429.0	17600.0
Mean	3456.5	10430.4	615.7	2643.5	14791.3	34521.7	20391.3	55.2	31695.7	351.1	452.2	887.4	62130.4	6825.0	3.2	312.8	6205.7
STD	454.1	3673.9	135.6	1238.0	3998.3	8675.3	7975.8	13.2	4704.3	374.6	136.7	359.6	14586.1	11426.4	9.7	51.0	4961.1
n	23	23	23	23	23	23	23	23	23	23	23	23	23	12	23	23	14
UCL	3618.6	11741.9	664.1	3085.4	16218.6	37618.6	23238.5	59.9	33375.0	484.8	501.0	1015.8	67337.3	10904.0	6.7	331.0	7976.7
%DET	4	100	100	100	100	100	100	48	100	65	65	74	100		11	39	100



**APPENDIX B**  
**SPREADSHEET CALCULATIONS**  
**OF RME AND AVERAGE INTAKES**  
**FOR CURRENT AND FUTURE RECEPTORS**

# CWMCS CHICAGO INCINERATOR FACILITY HUMAN HEALTH RISK ASSESSMENT

## 1. RME INHALATION OF PARTICULATES BY CURRENT REMEDIATION WORKERS

CFD = UPPER-BOUND or MAXIMUM concentration of COPCs in fugitive dust facility-wide (n = 20), whichever was lower)

CHEMICAL	CFD (mg/m3)	RR (m3/d)	ET (hr/d)	EF (d/yr)	ED (yrs)	BW (kg)	AT (days)
Antimony	2.9E-08	2.5	10	300	1	70	365
Beryllium	2.4E-09	2.5	10	300	1	70	365
Cadmium	2.4E-08	2.5	10	300	1	70	365
Chromium (b)	1.9E-06	2.5	10	300	1	70	365
Chromium VI (c)	1.9E-08	2.5	10	300	1	70	365
Copper	7.1E-08	2.5	10	300	1	70	365
Lead	4.2E-07	2.5	10	300	1	70	365
Mercury	3.7E-10	2.5	10	300	1	70	365
Selenium	1.5E-09	2.5	10	300	1	70	365
Silver	3.6E-09	2.5	10	300	1	70	365
Zinc	6.4E-07	2.5	10	300	1	70	365
Benzo(a)anthracene	8.8E-09	2.5	10	300	1	70	365
Benzo(a)pyrene	2.2E-09	2.5	10	300	1	70	365
Benzo(b)fluoranthene	4.6E-09	2.5	10	300	1	70	365
Benzo(k)fluoranthene	3.3E-09	2.5	10	300	1	70	365
Chrysene	3.3E-09	2.5	10	300	1	70	365
1,1-DCE	7.9E-12	2.5	10	300	1	70	365
Flouranthene	1.0E-08	2.5	10	300	1	70	365
Hexachlorobenzene	3.4E-09	2.5	10	300	1	70	365
Indeno(1,2,3-cd)pyrene	4.8E-09	2.5	10	300	1	70	365
Methylene Chloride	4.8E-12	2.5	10	300	1	70	365
Phenanthrene	1.6E-08	2.5	10	300	1	70	365
Pyrene	9.3E-09	2.5	10	300	1	70	365

## TOTAL

(a) Cancer intakes are calculated using an averaging time of 25,550 days.

(b) Toxicity constants for Cr III were used to model exposures to total chromium concentrations.

(c) Cr VI was assumed to be 1% of the total chromium concentration (Paustenbach et al., 1991).

## 2. RME INHALATION OF PARTICULATES BY CURRENT SECURITY WORKER

CFD = UPPER-BOUND or MAXIMUM concentration of COPCs in fugitive dust facility-wide (n = 20), whichever was lower)

CHEMICAL	CFD (mg/m3)	RR (m3/d)	ET (hr/d)	EF (d/yr)	ED (yrs)	BW (kg)	AT (days)
Antimony	2.9E-08	2.5	8	250	8	70	2920
Beryllium	2.4E-09	2.5	8	250	8	70	2920
Cadmium	2.4E-08	2.5	8	250	8	70	2920
Chromium (b)	1.9E-06	2.5	8	250	8	70	2920
Chromium VI (c)	1.9E-08	2.5	8	250	8	70	2920
Copper	7.1E-08	2.5	8	250	8	70	2920
Lead	4.2E-07	2.5	8	250	8	70	2920
Mercury	3.7E-10	2.5	8	250	8	70	2920
Selenium	1.5E-09	2.5	8	250	8	70	2920
Silver	3.6E-09	2.5	8	250	8	70	2920
Zinc	6.4E-07	2.5	8	250	8	70	2920
Benzo(a)anthracene	8.8E-09	2.5	8	250	8	70	2920
Benzo(a)pyrene	2.2E-09	2.5	8	250	8	70	2920
Benzo(b)fluoranthene	4.6E-09	2.5	8	250	8	70	2920
Benzo(k)fluoranthene	3.3E-09	2.5	8	250	8	70	2920
Chrysene	3.3E-09	2.5	8	250	8	70	2920
1,1-DCE	7.9E-12	2.5	8	250	8	70	2920
Flouranthene	1.0E-08	2.5	8	250	8	70	2920
Hexachlorobenzene	3.4E-09	2.5	8	250	8	70	2920
Indeno(1,2,3-cd)pyrene	4.8E-09	2.5	8	250	8	70	2920
Methylene Chloride	4.8E-12	2.5	8	250	8	70	2920
Phenanthrene	1.6E-08	2.5	8	250	8	70	2920
Pyrene	9.3E-09	2.5	8	250	8	70	2920

## TOTAL

(a) Cancer intakes are calculated using an averaging time of 25,550 days.

(b) Toxicity constants for Cr III were used to model exposures to total chromium concentrations.

(c) Cr VI was assumed to be 1% of the total chromium concentration (Paustenbach et al., 1991).

### 3. RME INHALATION OF PARTICULATES BY CURRENT INCINERATION WORKER

CFD = UPPER-BOUND or MAXIMUM concentration of COPCs in fugitive dust facility-wide (n = 20), whichever was lower)

CHEMICAL	CFD (mg/m3)	RR (m3/d)	ET (hr/d)	EF (d/yr)	ED (yrs)	BW (kg)	AT (days)
Antimony	2.9E-08	2.5	8	250	8	70	2920
Beryllium	2.4E-09	2.5	8	250	8	70	2920
Cadmium	2.4E-08	2.5	8	250	8	70	2920
Chromium (b)	1.9E-06	2.5	8	250	8	70	2920
Chromium VI (c)	1.9E-08	2.5	8	250	8	70	2920
Copper	7.1E-08	2.5	8	250	8	70	2920
Lead	4.2E-07	2.5	8	250	8	70	2920
Mercury	3.7E-10	2.5	8	250	8	70	2920
Selenium	1.5E-09	2.5	8	250	8	70	2920
Silver	3.6E-09	2.5	8	250	8	70	2920
Zinc	6.4E-07	2.5	8	250	8	70	2920
Benzo(a)anthracene	8.8E-09	2.5	8	250	8	70	2920
Benzo(a)pyrene	2.2E-09	2.5	8	250	8	70	2920
Benzo(b)fluoranthene	4.6E-09	2.5	8	250	8	70	2920
Benzo(k)fluoranthene	3.3E-09	2.5	8	250	8	70	2920
Chrysene	3.3E-09	2.5	8	250	8	70	2920
1,1-DCE	7.9E-12	2.5	8	250	8	70	2920
Flouranthene	1.0E-08	2.5	8	250	8	70	2920
Hexachlorobenzene	3.4E-09	2.5	8	250	8	70	2920
Indeno(1,2,3-cd)pyrene	4.8E-09	2.5	8	250	8	70	2920
Methylene Chloride	4.8E-12	2.5	8	250	8	70	2920
Phenanthrene	1.6E-08	2.5	8	250	8	70	2920
Pyrene	9.3E-09	2.5	8	250	8	70	2920

### TOTAL

(a) Cancer intakes are calculated using an averaging time of 25,550 days.

(b) Toxicity constants for Cr III were used to model exposures to total chromium concentrations.

(c) Cr VI was assumed to be 1% of the total chromium concentration (Paustenbach et al., 1991).

#### 4. RME INHALATION OF PARTICULATES BY HYPOTHETICAL FUTURE WORKER - ED = 25 YRS

CFD = UPPER-BOUND or MAXIMUM concentration of COPCs in fugitive dust facility wide (n = 20), whichever was lower)

CHEMICAL	CFD (mg/m3)	RR (m3/d)	ET (hr/d)	EF (d/yr)	ED (yrs)	BW (kg)	AT (days)
Antimony	2.9E-08	2.5	8	250	25	70	9125
Beryllium	2.4E-09	2.5	8	250	25	70	9125
Cadmium	2.4E-08	2.5	8	250	25	70	9125
Chromium (b)	1.9E-06	2.5	8	250	25	70	9125
Chromium VI (c)	1.9E-08	2.5	8	250	25	70	9125
Copper	7.1E-08	2.5	8	250	25	70	9125
Lead	4.2E-07	2.5	8	250	25	70	9125
Mercury	3.7E-10	2.5	8	250	25	70	9125
Selenium	1.5E-09	2.5	8	250	25	70	9125
Silver	3.6E-09	2.5	8	250	25	70	9125
Zinc	6.4E-07	2.5	8	250	25	70	9125
Benzo(a)anthracene	8.8E-09	2.5	8	250	25	70	9125
Benzo(a)pyrene	2.2E-09	2.5	8	250	25	70	9125
Benzo(b)fluoranthene	4.6E-09	2.5	8	250	25	70	9125
Benzo(k)fluoranthene	3.3E-09	2.5	8	250	25	70	9125
Chrysene	3.3E-09	2.5	8	250	25	70	9125
1,1-DCE	7.9E-12	2.5	8	250	25	70	9125
Flouranthene	1.0E-08	2.5	8	250	25	70	9125
Hexachlorobenzene	3.4E-09	2.5	8	250	25	70	9125
Indeno(1,2,3-cd)pyrene	4.8E-09	2.5	8	250	25	70	9125
Methylene Chloride	4.8E-12	2.5	8	250	25	70	9125
Phenanthrene	1.6E-08	2.5	8	250	25	70	9125
Pyrene	9.3E-09	2.5	8	250	25	70	9125

#### TOTAL

(a) Cancer intakes are calculated using an averaging time of 25,550 days.

(b) Toxicity constants for Cr III were used to model exposures to total chromium concentrations.

(c) Cr VI was assumed to be 1% of the total chromium concentration (Paustenbach et al., 1991).

# 1. AVERAGE INHALATION OF PARTICULATES BY THE HYPOTHETICAL FUTURE WORKER (ED=25 YEARS)

CFD = MEAN concentration of COPCs in fugitive dust facility wide (n = 20).

CHEMICAL	Mean						
	CFD (mg/m3)	RR (m3/d)	ET (hr/d)	EF (d/yr)	ED (yrs)	BW (kg)	AT (days)
Antimony	1.8E-08	2.5	8	250	25	70	9125
Beryllium	2.0E-09	2.5	8	250	25	70	9125
Cadmium	7.9E-09	2.5	8	250	25	70	9125
Chromium (b)	2.5E-07	2.5	8	250	25	70	9125
Chromium VI (c)	0.0E+00	2.5	8	250	25	70	9125
Copper	6.2E-08	2.5	8	250	25	70	9125
Lead	1.3E-07	2.5	8	250	25	70	9125
Mercury	2.0E-10	2.5	8	250	25	70	9125
Selenium	9.4E-10	2.5	8	250	25	70	9125
Silver	1.9E-09	2.5	8	250	25	70	9125
Zinc	2.4E-07	2.5	8	250	25	70	9125
Benzo(a)anthracene	2.0E-09	2.5	8	250	25	70	9125
Benzo(a)pyrene	1.8E-09	2.5	8	250	25	70	9125
Benzo(b)fluoranthene	3.5E-09	2.5	8	250	25	70	9125
Benzo(k)fluoranthene	1.1E-09	2.5	8	250	25	70	9125
Chrysene	2.5E-09	2.5	8	250	25	70	9125
1,1-DCE	5.1E-12	2.5	8	250	25	70	9125
Flouranthene	2.3E-09	2.5	8	250	25	70	9125
Hexachlorobenzene	6.2E-10	2.5	8	250	25	70	9125
Indeno(1,2,3-cd)pyrene	1.4E-09	2.5	8	250	25	70	9125
Methylene Chloride	3.5E-12	2.5	8	250	25	70	9125
Phenanthrene	2.2E-09	2.5	8	250	25	70	9125
Pyrene	2.2E-09	2.5	8	250	25	70	9125

## TOTAL

(a) Cancer intakes are calculated using an averaging time of 25,550 days.

(b) Toxicity constants for Cr III were used to model exposures to total chromium concentrations.

(c) All chromium was assumed to be Chromium III.

Intake	Subchronic	Hazard	SF	Cancer	
(mg/kg-d)	RfC	Quotient	(mg/kg-d)-1	Intake(a)	Risk
(mg/kg-d)	(mg/kg-d)			(mg/kg-d)	
8.5E-09	NA	--	NA	1.2E-10	0E+00
7.0E-10	NA	--	8.4	1.0E-11	8E-11
7.0E-09	NA	--	6.3	1.0E-10	6E-10
5.6E-07	NA	--	NA	8.0E-09	0E+00
5.6E-09	NA	--	41	8.0E-11	3E-09
2.1E-08	NA	--	NA	3.0E-10	0E+00
1.2E-07	NA	--	NA	1.8E-09	0E+00
1.1E-10	8.6E-05	1.26E-06	NA	1.6E-12	
4.4E-10	NA	--	NA	6.3E-12	0E+00
1.1E-09	NA	--	NA	1.5E-11	0E+00
1.1E-09	NA	--	NA	1.5E-11	0E+00
2.6E-09	NA	--	0.61	3.7E-11	2E-11
6.5E-10	NA	--	6.1	9.2E-12	6E-11
1.4E-09	NA	--	0.61	1.9E-11	1E-11
9.7E-10	NA	--	0.61	1.4E-11	8E-12
9.7E-10	NA	--	0.0061	1.4E-11	8E-14
2.3E-12	NA	--	0.175	3.3E-14	6E-15
2.9E-09	NA	--	NA	4.2E-11	0E+00
1.0E-09	NA	--	1.6	4.2E-11	7E-11
1.4E-09	NA	--	0.61	1.4E-11	9E-12
1.4E-12	0.86	1.64E-12	0.00165	2.0E-11	3E-14
4.7E-09	NA	--	NA	6.7E-11	0E+00
2.7E-09	NA	--	NA	6.7E-11	0E+00
		1.3E-06			
					4E-09

Intake	Chronic	Hazard	SF	Cancer	
(mg/kg-d)	RfD	Quotient	(mg/kg-d)-1	Intake(a)	Risk
(mg/kg-d)	(mg/kg-d)			(mg/kg-d)	
5.7E-09	NA	--	NA	6.5E-10	0E+00
4.7E-10	NA	--	8.4	5.4E-11	5E-10
4.7E-09	NA	--	6.3	5.4E-10	3E-09
3.7E-07	NA	--	NA	4.2E-08	0E+00
3.7E-09	NA	--	41	4.2E-10	2E-08
1.4E-08	NA	--	NA	1.6E-09	0E+00
8.2E-08	NA	--	NA	9.4E-09	0E+00
7.2E-11	8.6E-05	8.42E-07	NA	8.3E-12	0E+00
2.9E-10	NA	--	NA	3.4E-11	0E+00
7.0E-10	NA	--	NA	8.1E-11	0E+00
7.0E-10	NA	--	NA	8.1E-11	0E+00
1.7E-09	NA	--	0.61	2.0E-10	1E-10
4.3E-10	NA	--	6.1	4.9E-11	3E-10
9.0E-10	NA	--	0.61	1.0E-10	6E-11
6.5E-10	NA	--	0.61	7.4E-11	5E-11
6.5E-10	NA	--	0.0061	7.4E-11	5E-13
1.5E-12	NA	--	0.175	1.8E-13	3E-14
2.0E-09	NA	--	NA	2.2E-10	0E+00
6.7E-10	NA	--	1.6	2.2E-10	4E-10
9.4E-10	NA	--	0.61	7.6E-11	5E-11
9.4E-13	0.86	1.09E-12	0.00165	1.1E-10	2E-13
3.1E-09	NA	--	NA	3.6E-10	0E+00
1.8E-09	NA	--	NA	3.6E-10	0E+00
<hr/>				<hr/>	
8E-07				2E-08	



Intake (mg/kg-d)	Chronic RfD (mg/kg-d)	Hazard Quotient	SF (mg/kg-d) <sup>-1</sup>	Cancer Intake(a) (mg/kg-d)	Risk
5.7E-09	NA	--	NA	6.5E-10	0E+00
4.7E-10	NA	--	8.4	5.4E-11	5E-10
4.7E-09	NA	--	6.3	5.4E-10	3E-09
3.7E-07	NA	--	NA	4.2E-08	0E+00
3.7E-09	NA	--	41	4.2E-10	2E-08
1.4E-08	NA	--	NA	1.6E-09	0E+00
8.2E-08	NA	--	NA	9.4E-09	0E+00
7.2E-11	8.6E-05	8.42E-07	NA	8.3E-12	0E+00
2.9E-10	NA	--	NA	3.4E-11	0E+00
7.0E-10	NA	--	NA	8.1E-11	0E+00
7.0E-10	NA	--	NA	8.1E-11	0E+00
1.7E-09	NA	--	0.61	2.0E-10	1E-10
4.3E-10	NA	--	6.1	4.9E-11	3E-10
9.0E-10	NA	--	0.61	1.0E-10	6E-11
6.5E-10	NA	--	0.61	7.4E-11	5E-11
6.5E-10	NA	--	0.0061	7.4E-11	5E-13
1.5E-12	NA	--	0.175	1.8E-13	3E-14
2.0E-09	NA	--	NA	2.2E-10	0E+00
6.7E-10	NA	--	1.6	2.2E-10	4E-10
9.4E-10	NA	--	0.61	7.6E-11	5E-11
9.4E-13	0.86	1.09E-12	0.00165	1.1E-10	2E-13
3.1E-09	NA	--	NA	3.6E-10	0E+00
1.8E-09	NA	--	NA	3.6E-10	0E+00
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8E-07			2E-08		

Intake	Chronic	Hazard	SF	Cancer	
(mg/kg-d)	RfD	Quotient	(mg/kg-d) <sup>-1</sup>	Intake(a)	Risk
(mg/kg-d)	(mg/kg-d)			(mg/kg-d)	
5.7E-09	NA	--	NA	2.0E-09	0E+00
4.7E-10	NA	--	8.4	1.7E-10	1E-09
4.7E-09	NA	--	6.3	1.7E-09	1E-08
3.7E-07	NA	--	NA	1.3E-07	0E+00
3.7E-09	NA	--	41	1.3E-09	5E-08
1.4E-08	NA	--	NA	5.0E-09	0E+00
8.2E-08	NA	--	NA	2.9E-08	0E+00
7.2E-11	8.6E-05	8.42E-07	NA	2.6E-11	0E+00
2.9E-10	NA	--	NA	1.0E-10	0E+00
7.0E-10	NA	--	NA	2.5E-10	0E+00
7.0E-10	NA	--	NA	2.5E-10	0E+00
1.7E-09	NA	--	0.61	6.2E-10	4E-10
4.3E-10	NA	--	6.1	1.5E-10	9E-10
9.0E-10	NA	--	0.61	3.2E-10	2E-10
6.5E-10	NA	--	0.61	2.3E-10	1E-10
6.5E-10	NA	--	0.0061	2.3E-10	1E-12
1.5E-12	NA	--	0.175	5.5E-13	1E-13
2.0E-09	NA	--	NA	7.0E-10	0E+00
6.7E-10	NA	--	1.6	7.0E-10	1E-09
9.4E-10	NA	--	0.61	2.4E-10	1E-10
9.4E-13	0.86	1.09E-12	0.00165	3.4E-10	6E-13
3.1E-09	NA	--	NA	1.1E-09	0E+00
1.8E-09	NA	--	NA	1.1E-09	0E+00
<hr/>				<hr/>	
8E-07				7E-08	

	Chronic		Cancer	
Intake (mg/kg-d)	RfD (mg/kg-d)	Hazard Quotient	SF (mg/kg-d) <sup>-1</sup>	Intake(a) (mg/kg-d) Risk
3.5E-09	NA	--	NA	1.3E-09 0E+00
3.9E-10	NA	--	8.4	1.4E-10 1E-09
1.5E-09	NA	--	6.3	5.5E-10 3E-09
4.9E-08	NA	--	NA	1.7E-08 0E+00
0.0E+00	NA	--	41	0.0E+00 0E+00
1.2E-08	NA	--	NA	4.3E-09 0E+00
2.5E-08	NA	--	NA	9.1E-09 0E+00
3.9E-11	8.6E-05	4.55E-07	NA	1.4E-11 0E+00
1.8E-10	NA	--	NA	6.6E-11 0E+00
3.7E-10	NA	--	NA	1.3E-10 0E+00
3.7E-10	NA	--	NA	1.3E-10 0E+00
3.9E-10	NA	--	0.61	1.4E-10 9E-11
3.5E-10	NA	--	6.1	1.3E-10 8E-10
6.8E-10	NA	--	0.61	2.4E-10 1E-10
2.2E-10	NA	--	0.61	7.7E-11 5E-11
4.9E-10	NA	--	0.0061	1.7E-10 1E-12
1.0E-12	NA	--	0.175	3.6E-13 6E-14
4.5E-10	NA	--	NA	1.6E-10 0E+00
1.2E-10	NA	--	1.6	1.6E-10 3E-10
2.7E-10	NA	--	0.61	4.3E-11 3E-11
6.8E-13	0.86	7.96E-13	0.00165	9.8E-11 2E-13
4.3E-10	NA	--	NA	1.5E-10 0E+00
4.3E-10	NA	--	NA	1.5E-10 0E+00
		5E-07		6E-09

CHEMWASTE HUMAN HEALTH RISK ASSESSMENT

1. RME SCENARIO: ADULT REMEDIATION WORKER SOIL DERMAL

(CS = UPPER-BOUND or MAXIMUM concentration of COPCs in surface soils inside the fence only (n = 11), whichever is lower)

Chemical	UCL CS mg/kg	SA cm <sup>2</sup> / event	AF mg/cm <sup>2</sup>	CF	ABS	EF d/yr	ED yr	BW kg	AT days	Intake mg/kg-d	Subchronic RfD mg/kg-d	Hazard Quotient	Cancer Intake(a) mg/kg-d	Slope Factor mg/kg/d-1	Cancer Risk
<b>(Metals)</b>															
Antimony	23.00	1180.0	1	1E-06	0.01	300	1	70	365	3E-06	4.00E-04	0.008	4.55E-08	--	--
Beryllium	1.87	1180.0	1	1E-06	0.01	300	1	70	365	3E-07	5.00E-03	5.2E-05	3.71E-09	4.30E+00	2E-08
Cadmium	55.7	1180.0	1	1E-06	0.01	300	1	70	365	8E-06	1.00E-03	7.7E-03	1.10E-07	--	0E+00
Cr III (b)	887.96	1180.0	1	1E-06	0.01	300	1	70	365	1E-04	1.00E+01	1.2E-05	1.76E-06	--	--
Cr VI (c)	8.88	1180.0	1	1E-06	0.01	300	1	70	365	1E-06	2.00E-02	6.2E-05	1.76E-08	--	--
Copper	48.618	1180.0	1	1E-06	0.01	300	1	70	365	7E-06	3.70E-02	1.8E-04	9.62E-08	--	--
Lead	100.69	1180.0	1	1E-06	0.01	300	1	70	365	1E-05	---	--	1.99E-07	--	--
Mercury	0.1396	1180.0	1	1E-06	0.01	300	1	70	365	2E-08	3.00E-04	6.4E-05	2.76E-10	--	--
Selenium	1.468	1180.0	1	1E-06	0.01	300	1	70	365	2E-07	5.00E-03	4.1E-05	2.91E-09	--	--
Silver	2.97	1180.0	1	1E-06	0.01	300	1	70	365	4E-07	5.00E-03	8.2E-05	5.87E-09	--	--
Zinc	160.47	1180.0	1	1E-06	0.01	300	1	70	365	2E-05	3.00E-01	7.4E-05	3.18E-07	--	--
<b>Organics</b>															
1,1-DCE	0.0089	1180.0	1	1E-06	0.50	300	1	70	365	6E-08	9.00E-03	7E-06	8.81E-10	6.00E-01	5E-10
MC	0.0041	1180.0	1	1E-06	0.50	300	1	70	365	3E-08	6.00E-02	5E-07	4.06E-10	7.50E-03	3E-12
HCB	0.67	1180.0	1	1E-06	0.05	300	1	70	365	5E-07	8.00E-04	6E-04	6.58E-09	1.60E+00	1E-08
<b>PAHs</b>															
BA	2.36	1180.0	1	1E-06	0.05	300	1	70	365	2E-06	--	--	2.33E-08	7.3E-01	2E-08
BaP	1.50	1180.0	1	1E-06	0.05	300	1	70	365	1E-06	--	--	1.48E-08	7.30E+00	1E-07
B(b)F1	2.94	1180.0	1	1E-06	0.05	300	1	70	365	2E-06	--	--	2.91E-08	7.30E-01	2E-08
B(k)F1	1.50	1180.0	1	1E-06	0.05	300	1	70	365	1E-06	--	--	1.48E-08	7.30E-01	1E-08
Chrysene	1.59	1180.0	1	1E-06	0.05	300	1	70	365	1E-06	--	--	1.57E-08	7.30E-03	1E-10
Fluor.	2.57	1180.0	1	1E-06	0.05	300	1	70	365	2E-06	4.00E-01	4E-06	2.54E-08	--	0E+00
I(123-cd)P	1.54	1180.0	1	1E-06	0.05	300	1	70	365	1E-06	--	--	1.53E-08	7.30E-01	1E-08
Phenan.	10.21	1180.0	1	1E-06	0.05	300	1	70	365	7E-06	--	--	1.01E-07	--	0E+00
Pyrene	2.48	1180.0	1	1E-06	0.05	300	1	70	365	2E-06	3.00E-01	6E-06	2.45E-08	--	--
<b>TOTALS</b>												0.02	2E-07		

(a) Cancer intakes were divided by an averaging time of 25,550 days.

(b) Toxicity constants for Cr III were used to model exposures to total chromium concentrations.

(c) Cr VI was assumed to be 1% of the total chromium concentration (Paustenbach et al., 1991).

## 2. RME SCENARIO: ADULT SECURITY AND INCINERATION WORKERS SOIL DERMAL

(CFD = UPPER-BOUND or MAXIMUM concentration of COPCs in fugitive dust, whichever is lower).

Chemical	UCL CFD (mg/m3)	SA (cm2/event)	AF (mg/cm2)	CF1 (kg/mg)	ABS	EF (d/yr)	ED (yr)	BW (kg)	AT (days)	CF2 (a)	Intake (mg/kg-d)	Chronic RfD (mg/kg-d)	Hazard Quotient	Cancer Intake(b) (mg/kg-d)	Slope Factor (mg/kg-d)	Cancer Risk
<b>(Metals)</b>																
Antimony	2.9E-08	2020.0	1	1E-06	0.01	250	8	70	2920	1.29	4.44E-15	4.00E-04	1.1E-11	5.08E-16	--	--
Beryllium	2.4E-09	2020.0	1	1E-06	0.01	250	8	70	2920	1.29	3.68E-16	5.00E-03	7.4E-14	4.20E-17	4.3E+00	2E-16
Cadmium	2.4E-08	2020.0	1	1E-06	0.01	250	8	70	2920	1.29	3.68E-15	1.00E-03	3.7E-12	4.20E-16	--	0E+00
Cr (c)	1.9E-06	2020.0	1	1E-06	0.01	250	8	70	2920	1.29	2.91E-13	1.00E+00	2.9E-13	3.33E-14	--	--
Cr VI (d)	1.9E-08	2020.0	1	1E-06	0.01	250	8	70	2920	1.29	2.91E-15	5.00E-03	5.8E-13	3.33E-16	--	--
Copper	7.1E-08	2020.0	1	1E-06	0.01	250	8	70	2920	1.29	1.09E-14	3.70E-02	2.9E-13	1.24E-15	--	--
Lead	4.2E-07	2020.0	1	1E-06	0.01	250	8	70	2920	1.29	6.44E-14	---	--	7.35E-15	--	--
Mercury	3.7E-10	2020.0	1	1E-06	0.01	250	8	70	2920	1.29	5.67E-17	3.00E-04	1.9E-13	6.48E-18	--	--
Selenium	1.5E-09	2020.0	1	1E-06	0.01	250	8	70	2920	1.29	2.30E-16	5.00E-03	4.6E-14	2.63E-17	--	--
Silver	3.6E-09	2020.0	1	1E-06	0.01	250	8	70	2920	1.29	5.52E-16	5.00E-03	1.1E-13	6.30E-17	--	--
Zinc	6.4E-07	2020.0	1	1E-06	0.01	250	8	70	2920	1.29	9.81E-14	3.00E-01	3.3E-13	1.12E-14	--	--
<b>Organics</b>																
1,1-DCE	7.9E-12	2020.0	1	1E-06	0.50	250	8	70	2920	1.29	6.05E-17	9.00E-03	7E-15	6.92E-18	6.0E-02	4E-19
MC	4.8E-12	2020.0	1	1E-06	0.50	250	8	70	2920	1.29	3.68E-17	6.00E-02	6E-16	4.20E-18	7.5E-03	3E-20
HCB	3.4E-09	2020.0	1	1E-06	0.05	250	8	70	2920	1.29	2.60E-15	8.00E-04	3E-12	2.98E-16	1.6E+00	5E-16
<b>PAHs</b>																
BA	8.8E-09	2020.0	1	1E-06	0.05	250	8	70	2920	1.29	6.74E-15	--	--	7.70E-16	7.3E-01	6E-16
BaP	2.2E-09	2020.0	1	1E-06	0.05	250	8	70	2920	1.29	1.69E-15	--	--	1.93E-16	7.3E+00	1E-15
B(b)F1	4.6E-09	2020.0	1	1E-06	0.05	250	8	70	2920	1.29	3.52E-15	--	--	4.03E-16	7.3E-01	3E-16
B(k)F1	3.3E-09	2020.0	1	1E-06	0.05	250	8	70	2920	1.29	2.53E-15	--	--	2.89E-16	7.3E-01	2E-16
Chrysene	3.3E-09	2020.0	1	1E-06	0.05	250	8	70	2920	1.29	2.53E-15	--	--	2.89E-16	7.3E-03	2E-18
Fluor.	1.0E-08	2020.0	1	1E-06	0.05	250	8	70	2920	1.29	7.66E-15	4.00E-02	2E-13	8.76E-16	--	0E+00
I(123-cd)P	4.8E-09	2020.0	1	1E-06	0.05	250	8	70	2920	1.29	3.68E-15	--	--	4.20E-16	7.3E-01	3E-16
Phenan.	1.6E-08	2020.0	1	1E-06	0.05	250	8	70	2920	1.29	1.23E-14	--	--	1.40E-15	--	0E+00
Pyrene	9.3E-09	2020.0	1	1E-06	0.05	250	8	70	2920	1.29	7.12E-15	3.00E-02	2E-13	8.14E-16	--	--
<b>TOTALS</b>													<b>2.0E-11</b>	<b>3E-15</b>		

CFD = concentration in fugitive dust.

(a) CF2 = conversion factor 2 = (m3/1000 L) (L/1.29 g) (1000g/kg), where 1.29 g/L is the density of air.

(b) Cancer intakes were divided by an averaging time of 25,550 days.

(c) Toxicity constants for Cr III were used to model exposures to total chromium concentrations.

(d) Cr VI was assumed to be 1% of the total chromium concentration (Paustenbach et al., 1991).

### 3. RME SCENARIO: FUTURE WORKERS (25-YR EXPOSURE) SOIL DERMAL

(CFD = UPPER-BOUND or MAXIMUM concentration of COPCs in fugitive dust, whichever is lower)

Chemical	UCL CFD (mg/m <sup>3</sup> )	SA (cm <sup>2</sup> /event)	AF (mg/cm <sup>2</sup> )	CF (kg/mg)	ABS	EF (d/yr)	ED (yr)	BW (kg)	AT (days)	CF2 (a)	Intake (mg/kg-d)	Chronic RfD (mg/kg-d)	Hazard Quotient	Cancer Intake(b) (mg/kg-d)	Slope Factor (mg/kg-d)	Cancer Risk
<b>(Metals)</b>																
Antimony	2.9E-08	2020.0	1	1E-06	0.01	250	25	70	9125	1.29	4.44E-15	4.00E-04	1.1E-11	1.59E-15	--	--
Beryllium	2.4E-09	2020.0	1	1E-06	0.01	250	25	70	9125	1.29	3.68E-16	5.00E-03	7.4E-14	1.31E-16	4.3E+00	6E-16
Cadmium	2.4E-08	2020.0	1	1E-06	0.01	250	25	70	9125	1.29	3.68E-15	1.00E-03	3.7E-12	1.31E-15	--	0E+00
Cr (c)	1.9E-06	2020.0	1	1E-06	0.01	250	25	70	9125	1.29	2.91E-13	1.00E+00	2.9E-13	1.04E-13	--	--
Cr VI (d)	1.9E-08	2020.0	1	1E-06	0.01	250	25	70	9125	1.29	2.91E-15	5.00E-03	5.8E-13	1.04E-15	--	--
Copper	7.1E-08	2020.0	1	1E-06	0.01	250	25	70	9125	1.29	1.09E-14	3.70E-02	2.9E-13	3.89E-15	--	--
Lead	4.2E-07	2020.0	1	1E-06	0.01	250	25	70	9125	1.29	6.44E-14	---	--	2.30E-14	--	--
Mercury	3.7E-10	2020.0	1	1E-06	0.01	250	25	70	9125	1.29	5.67E-17	3.00E-04	1.9E-13	2.02E-17	--	--
Selenium	1.5E-09	2020.0	1	1E-06	0.01	250	25	70	9125	1.29	2.30E-16	5.00E-03	4.6E-14	8.21E-17	--	--
Silver	3.6E-09	2020.0	1	1E-06	0.01	250	25	70	9125	1.29	5.52E-16	5.00E-03	1.1E-13	1.97E-16	--	--
Zinc	6.4E-07	2020.0	1	1E-06	0.01	250	25	70	9125	1.29	9.81E-14	3.00E-01	3.3E-13	3.50E-14	--	--
<b>Organics</b>																
1,1-DCE	7.9E-12	2020.0	1	1E-06	0.50	250	25	70	9125	1.29	6.05E-17	9.00E-03	7E-15	2.16E-17	6.0E-01	1E-17
MC	4.8E-12	2020.0	1	1E-06	0.50	250	25	70	9125	1.29	3.68E-17	6.00E-02	6E-16	1.31E-17	7.5E-03	1E-19
HCB	3.4E-09	2020.0	1	1E-06	0.05	250	25	70	9125	1.29	2.60E-15	8.00E-04	3E-12	9.30E-16	1.6E+00	1E-15
<b>PAHs</b>																
BA	8.8E-09	2020.0	1	1E-06	0.05	250	25	70	9125	1.29	6.74E-15	--	--	2.41E-15	7.3E-01	2E-15
BaP	2.2E-09	2020.0	1	1E-06	0.05	250	25	70	9125	1.29	1.69E-15	--	--	6.02E-16	7.3E+00	4E-15
B(b)F1	4.6E-09	2020.0	1	1E-06	0.05	250	25	70	9125	1.29	3.52E-15	--	--	1.26E-15	7.3E-01	9E-16
B(k)F1	3.3E-09	2020.0	1	1E-06	0.05	250	25	70	9125	1.29	2.53E-15	--	--	9.03E-16	7.3E-01	7E-16
Chrysene	3.3E-09	2020.0	1	1E-06	0.05	250	25	70	9125	1.29	2.53E-15	--	--	9.03E-16	7.3E-03	7E-18
Fluor.	1.0E-08	2020.0	1	1E-06	0.05	250	25	70	9125	1.29	7.66E-15	4.00E-02	2E-13	2.74E-15	--	0E+00
I(123-cd)P	4.8E-09	2020.0	1	1E-06	0.05	250	25	70	9125	1.29	3.68E-15	--	--	1.31E-15	7.3E-01	1E-15
Phenan.	1.6E-08	2020.0	1	1E-06	0.05	250	25	70	9125	1.29	1.23E-14	--	--	4.38E-15	--	0E+00
Pyrene	9.3E-09	2020.0	1	1E-06	0.05	250	25	70	9125	1.29	7.12E-15	3.00E-02	2E-13	2.54E-15	--	0E+00
													2E-11			1E-14

#### TOTALS

CFD = concentration in fugitive dust.

(a) CF2 = conversion factor 2 = (m<sup>3</sup>/1000 L) (L/1.29 g) (1000g/kg), where 1.29 g/L is the density of air.

(b) Cancer intakes were divided by an averaging time of 25,550 days.

(c) Toxicity constants for Cr III were used to model exposures to total chromium concentrations.

(d) Cr VI was assumed to be 1% of the total chromium concentration (Paustenbach et al., 1991).

#### 4. RME SCENARIO: FUTURE WORKERS (8-YR EXPOSURE) SOIL DERMAL

(CFD = UPPER-BOUND or MAXIMUM concentration of COPCs in fugitive dust, whichever is lower)

Chemical	UCL CFD (mg/m <sup>3</sup> )	SA (cm <sup>2</sup> /event)	AF (mg/cm <sup>2</sup> )	CF (kg/mg)	ABS	EF (d/yr)	ED (yr)	BW (kg)	AT (days)	CF2 (a)	Intake (mg/kg-d)	Chronic RfD (mg/kg-d)	Hazard Quotient	Cancer Intake (b) (mg/kg-d)	Slope Factor (mg/kg-d)	Cancer Risk
<b>(Metals)</b>																
Antimony	2.9E-08	2020.0	1	1E-06	0.01	250	8	70	2920	1.29	4.44E-15	4.00E-04	0.000	5.08E-16	--	--
Beryllium	2.4E-09	2020.0	1	1E-06	0.01	250	8	70	2920	1.29	3.68E-16	5.00E-03	7.4E-14	4.20E-17	4.3E+00	2E-16
Cadmium	2.4E-08	2020.0	1	1E-06	0.01	250	8	70	2920	1.29	3.68E-15	1.00E-03	3.7E-12	4.20E-16	--	0E+00
Cr (c)	1.9E-06	2020.0	1	1E-06	0.01	250	8	70	2920	1.29	2.91E-13	1.00E+00	2.9E-13	3.33E-14	--	--
Cr VI (d)	1.9E-08	2020.0	1	1E-06	0.01	250	8	70	2920	1.29	2.91E-15	5.00E-03	5.8E-13	3.33E-16	--	--
Copper	7.1E-08	2020.0	1	1E-06	0.01	250	8	70	2920	1.29	1.09E-14	3.70E-02	2.9E-13	1.24E-15	--	--
Lead	4.2E-07	2020.0	1	1E-06	0.01	250	8	70	2920	1.29	6.44E-14	---	--	7.35E-15	--	--
Mercury	3.7E-10	2020.0	1	1E-06	0.01	250	8	70	2920	1.29	5.67E-17	3.00E-04	1.9E-13	6.48E-18	--	--
Selenium	1.5E-09	2020.0	1	1E-06	0.01	250	8	70	2920	1.29	2.30E-16	5.00E-03	4.6E-14	2.63E-17	--	--
Silver	3.6E-09	2020.0	1	1E-06	0.01	250	8	70	2920	1.29	5.52E-16	5.00E-03	1.1E-13	6.30E-17	--	--
Zinc	6.4E-07	2020.0	1	1E-06	0.01	250	8	70	2920	1.29	9.81E-14	3.00E-01	3.3E-13	1.12E-14	--	--
<b>Organics</b>																
1,1-DCE	7.9E-12	2020.0	1	1E-06	0.50	250	8	70	2920	1.29	6.05E-17	9.00E-03	7E-15	6.92E-18	6.0E-01	4E-18
MC	4.8E-12	2020.0	1	1E-06	0.50	250	8	70	2920	1.29	3.68E-17	6.00E-02	6E-16	4.20E-18	7.5E-03	3E-20
HCB	3.4E-09	2020.0	1	1E-06	0.05	250	8	70	2920	1.29	2.60E-15	8.00E-04	3E-12	2.98E-16	1.6E+00	5E-16
<b>PAHs</b>																
BA	8.8E-09	2020.0	1	1E-06	0.05	250	8	70	2920	1.29	6.74E-15	--	--	7.70E-16	7.3E-01	6E-16
BaP	2.2E-09	2020.0	1	1E-06	0.05	250	8	70	2920	1.29	1.69E-15	--	--	1.93E-16	7.3E+00	1E-15
B(b)F1	4.6E-09	2020.0	1	1E-06	0.05	250	8	70	2920	1.29	3.52E-15	--	--	4.03E-16	7.3E-01	3E-16
B(k)F1	3.3E-09	2020.0	1	1E-06	0.05	250	8	70	2920	1.29	2.53E-15	--	--	2.89E-16	7.3E-01	2E-16
Chrysene	3.3E-09	2020.0	1	1E-06	0.05	250	8	70	2920	1.29	2.53E-15	--	--	2.89E-16	7.3E-03	2E-18
Fluor.	1.0E-08	2020.0	1	1E-06	0.05	250	8	70	2920	1.29	7.66E-15	4.00E-02	2E-13	8.76E-16	--	0E+00
I(123-cd)P	4.8E-09	2020.0	1	1E-06	0.05	250	8	70	2920	1.29	3.68E-15	--	--	4.20E-16	7.3E-01	3E-16
Phenan.	1.6E-08	2020.0	1	1E-06	0.05	250	8	70	2920	1.29	1.23E-14	--	--	1.40E-15	--	0E+00
Pyrene	9.3E-09	2020.0	1	1E-06	0.05	250	8	70	2920	1.29	7.12E-15	3.00E-02	2E-13	8.14E-16	--	0E+00
													2E-11			3E-15

#### TOTALS

CFD = concentration in fugitive dust.

(a) CF2 = conversion factor 2 = (m<sup>3</sup>/1000 L) (L/1.29 g) (1000g/kg), where 1.29 g/L is the density of air.

(b) Cancer intakes were divided by an averaging time of 25,550 days.

(c) Toxicity constants for Cr III were used to model exposures to total chromium concentrations.

(d) Cr VI was assumed to be 1% of the total chromium concentration (Paustenbach et al., 1991).

1. AVERAGE SCENARIO: HYPOTHETICAL FUTURE WORKERS (25-YR EXPOSURE) SOIL DERMAL  
(CFD = MEAN concentration of COPCs in fugitive dust)

Chemical	MEAN CFD (mg/m3)	SA (cm2/event)	AF (mg/cm2)	CF (kg/mg)	ABS	EF (d/yr)	ED (yr)	BW (kg)	AT (days)	CF2 (a)	Intake (mg/kg-d)	Chronic RfD (mg/kg-d)	Hazard Quotient	Cancer Intake(b) (mg/kg-d)	Slope Factor (mg/kg-d)	Cancer Risk
<b>(Metals)</b>																
Antimony	1.8E-08	2020.0	0.2	1E-06	0.01	250	25	70	9125	1.29	5.52E-16	4.00E-04	1E-12	1.97E-16	--	--
Beryllium	2.0E-09	2020.0	0.2	1E-06	0.01	250	25	70	9125	1.29	6.13E-17	5.00E-03	1.2E-14	2.19E-17	4.3E+00	9E-17
Cadmium	7.9E-09	2020.0	0.2	1E-06	0.01	250	25	70	9125	1.29	2.42E-16	1.00E-03	2.4E-13	8.65E-17	--	0E+00
Cr (c)	2.5E-07	2020.0	0.2	1E-06	0.01	250	25	70	9125	1.29	7.66E-15	1.00E+00	7.7E-15	2.74E-15	--	--
Cr VI (d)	0.0E+00	2020.0	0.2	1E-06	0.01	250	25	70	9125	1.29	0.00E+00	5.00E-03	0.0E+00	0.00E+00	--	--
Copper	6.2E-08	2020.0	0.2	1E-06	0.01	250	25	70	9125	1.29	1.90E-15	5.00E-03	3.8E-13	6.79E-16	--	--
Lead	1.3E-07	2020.0	0.2	1E-06	0.01	250	25	70	9125	1.29	3.98E-15	---	--	1.42E-15	--	--
Mercury	2.0E-10	2020.0	0.2	1E-06	0.01	250	25	70	9125	1.29	6.13E-18	3.00E-04	2.0E-14	2.19E-18	--	--
Selenium	9.4E-10	2020.0	0.2	1E-06	0.01	250	25	70	9125	1.29	2.88E-17	5.00E-03	5.8E-15	1.03E-17	--	--
Silver	1.9E-09	2020.0	0.2	1E-06	0.01	250	25	70	9125	1.29	5.82E-17	5.00E-03	1.2E-14	2.08E-17	--	--
Zinc	2.4E-07	2020.0	0.2	1E-06	0.01	250	25	70	9125	1.29	7.35E-15	3.00E-01	2.5E-14	2.63E-15	--	--
<b>Organics</b>																
1,1-DCE	5.1E-12	2020.0	0.2	1E-06	0.50	250	25	70	9125	1.29	7.81E-18	9.00E-03	9E-16	2.79E-18	6.0E-01	2E-18
MC	3.5E-12	2020.0	0.2	1E-06	0.50	250	25	70	9125	1.29	5.36E-18	6.00E-02	9E-17	1.92E-18	7.5E-03	1E-20
HCB	6.2E-10	2020.0	0.2	1E-06	0.05	250	25	70	9125	1.29	9.50E-17	8.00E-04	1E-13	3.39E-17	1.6E+00	5E-17
<b>PAHs</b>																
BA	2.0E-09	2020.0	0.2	1E-06	0.05	250	25	70	9125	1.29	3.06E-16	--	--	1.09E-16	7.3E-01	8E-17
BaP	1.8E-09	2020.0	0.2	1E-06	0.05	250	25	70	9125	1.29	2.76E-16	--	--	9.85E-17	7.3E+00	7E-16
B(b)F1	3.5E-09	2020.0	0.2	1E-06	0.05	250	25	70	9125	1.29	5.36E-16	--	--	1.92E-16	7.3E-01	1E-16
B(k)F1	1.1E-09	2020.0	0.2	1E-06	0.05	250	25	70	9125	1.29	1.69E-16	--	--	6.02E-17	7.3E-01	4E-17
Chrysene	2.5E-09	2020.0	0.2	1E-06	0.05	250	25	70	9125	1.29	3.83E-16	--	--	1.37E-16	7.3E-03	1E-18
Fluor.	2.3E-09	2020.0	0.2	1E-06	0.05	250	25	70	9125	1.29	3.52E-16	4.00E-02	9E-15	1.26E-16	--	0E+00
I(123-cd)P	1.4E-09	2020.0	0.2	1E-06	0.05	250	25	70	9125	1.29	2.15E-16	--	--	7.66E-17	7.3E-01	6E-17
Phenan.	2.2E-09	2020.0	0.2	1E-06	0.05	250	25	70	9125	1.29	3.37E-16	--	--	1.20E-16	--	0E+00
Pyrene	2.2E-09	2020.0	0.2	1E-06	0.05	250	25	70	9125	1.29	3.37E-16	3.00E-02	1E-14 2E-12	1.20E-16	--	0E+00 1E-15

TOTALS

CFD = concentration in fugitive dust.

(a) CF2 = conversion factor 2 = (m3/1000 L) (L/1.29 g) (1000g/kg), where 1.29 g/L is the density of air.

(b) Cancer intakes were divided by an averaging time of 25,550 days.

(c) Toxicity constants for Cr III were used to model exposures to total chromium concentrations.

(d) All chromium measured in facility soils was assumed to be Chromium III.



CHEMWASTE HUMAN HEALTH RISK ASSESSMENT

1. RME SCENARIO: CURRENT ADULT REMEDIATION WORKER SOIL INGESTION (CS = UPPER-BOUND or MAXIMUM concentration of COPCs inside the fence only (n = 11), which (CS = UPPER-BOUND or MAXIMUM concentration of COPCs inside the fence only (n = 11), whichever is lower).

Chemical	UCL CS mg/kg	IR mg/d	CF kg/mg	FI	EF d/yr	ED yr	BW kg	AT days	Intake mg/kg-d	Subchronic RfD mg/kg-d	Hazard Quotient	Cancer Intake(a) mg/kg-d	Slope Factor mg/kg-d-1	Cancer Risk
(Metals)														
Antimony	23.00	50	1E-06	1.5	300	1	70	365	2.03E-05	4.00E-04	5E-02	2.89E-07	--	--
Beryllium	1.87	50	1E-06	1.5	300	1	70	365	1.65E-06	5.00E-03	3E-04	2.36E-08	4.30E+00	1E-07
Cadmium	55.7	50	1E-06	1.5	300	1	70	365	4.91E-05	1.00E-03	5E-02	7.01E-07	--	--
Cr (b)	887.96	50	1E-06	1.5	300	1	70	365	7.82E-04	1.00E+01	8E-05	1.12E-05	--	--
Cr VI (c)	8.88	50	1E-06	1.5	300	1	70	365	7.82E-06	2.00E-02	4E-04	1.12E-07	--	--
Copper	48.618	50	1E-06	1.5	300	1	70	365	4.28E-05	3.70E-02	1E-03	6.12E-07	--	--
Lead	100.69	50	1E-06	1.5	300	1	70	365	8.87E-05	---	---	1.27E-06	--	--
Mercury	0.1396	50	1E-06	1.5	300	1	70	365	1.23E-07	3.00E-04	4E-04	1.76E-09	--	--
Selenium	1.468	50	1E-06	1.5	300	1	70	365	1.29E-06	3.00E-03	4E-04	1.85E-08	--	--
Silver	2.97	50	1E-06	1.5	300	1	70	365	2.61E-06	5.00E-03	5E-04	3.73E-08	--	--
Zinc	160.47	50	1E-06	1.5	300	1	70	365	1.41E-04	3.00E-01	5E-04	2.02E-06	--	--
Organics														
1,1-DCE	0.0089	50	1E-06	1.5	300	1	70	365	7.84E-09	9.00E-03	9E-07	1.12E-10	6.00E-01	7E-11
MC	0.0041	50	1E-06	1.5	300	1	70	365	3.61E-09	6.00E-02	6E-08	5.16E-11	7.50E-03	4E-13
HCB	0.67	50	1E-06	1.5	300	1	70	365	5.86E-07	8.00E-04	7E-04	8.37E-09	1.60E+00	1E-08
PAHs														
BA	2.36	50	1E-06	1.5	300	1	70	365	2.08E-06	---	---	2.97E-08	7.30E-01	2E-08
BaP	1.50	50	1E-06	1.5	300	1	70	365	1.32E-06	---	---	1.89E-08	7.30E+00	1E-07
B(b)Fl	2.94	50	1E-06	1.5	300	1	70	365	2.59E-06	---	---	2.00E-08	7.30E-01	1E-08
B(k)Fl	1.50	50	1E-06	1.5	300	1	70	365	1.32E-06	---	---	1.89E-08	7.30E-01	1E-08
Chrysene	1.59	50	1E-06	1.5	300	1	70	365	1.40E-06	---	---	2.00E-08	7.30E-03	1E-10
Fluor.	2.57	50	1E-06	1.5	300	1	70	365	2.26E-06	4.00E-01	6E-06	3.23E-08	--	0E+00
I (123-cd)P	1.54	50	1E-06	1.5	300	1	70	365	1.36E-06	--	--	1.94E-08	7.30E-01	1E-08
Phenan.	10.21	50	1E-06	1.5	300	1	70	365	8.99E-06	--	--	1.28E-07	--	0E+00
Pyrene	2.48	50	1E-06	1.5	300	1	70	365	2.18E-06	3.00E-01	7E-06	3.12E-08	--	--
											0.10			3E-07

TOTALS

- (a) Cancer intakes are divided by an averaging time of 25,550 days.  
 (b) Toxicity constants for chromium III were used to model exposures to total chromium.  
 (c) Chromium VI was assumed to be 1% of the total chromium concentration (Paustenbach et al., 1991).

## 2. RME SCENARIO: CURRENT INCINERATION WORKER SOIL INGESTION

(CS = UPPER-BOUND or MAXIMUM concentration of COPCs inside the fence only (n = 11), whichever is lower)

	UCL									Chronic		Cancer	Slope	
	CS	IR	CF	FI	EF	ED	BW	AT	Intake	RfD	Hazard	Intake(a)	Factor	Cancer
Chemical	(mg/kg)	(mg/d)	(kg/mg)		(d/yr)	(yr)	(kg)	(days)	(mg/kg-d)	(mg/kg-d)	Quotient	(mg/kg-d)	(mg/kg-d)-1	Risk
(Metals)														
Antimony	23.00	50	1E-06	0.25	250	8	70	2920	2.81E-06	4.00E-04	0.007	3.21E-07	--	--
Beryllium	1.87	50	1E-06	0.25	250	8	70	2920	2.29E-07	5.00E-03	4.6E-05	2.62E-08	4.30E+00	1E-07
Cadmium	55.7	50	1E-06	0.25	250	8	70	2920	6.81E-06	1.00E-03	6.8E-03	7.79E-07	--	0E+00
Cr (b)	887.96	50	1E-06	0.25	250	8	70	2920	1.09E-04	1.00E+00	1.1E-04	1.24E-05	--	--
Cr VI (c)	8.88	50	1E-06	0.25	250	8	70	2920	1.09E-06	5.00E-03	2.2E-04	1.24E-07	--	--
Copper	48.618	50	1E-06	0.25	250	8	70	2920	5.95E-06	3.70E-02	1.6E-04	6.80E-07	--	--
Lead	100.69	50	1E-06	0.25	250	8	70	2920	1.23E-05	---	--	1.41E-06	--	--
Mercury	0.1396	50	1E-06	0.25	250	8	70	2920	1.71E-08	3.00E-04	5.7E-05	1.95E-09	--	--
Selenium	1.468	50	1E-06	0.25	250	8	70	2920	1.80E-07	5.00E-03	3.6E-05	2.05E-08	--	--
Silver	2.97	50	1E-06	0.25	250	8	70	2920	3.63E-07	5.00E-03	7.3E-05	4.15E-08	--	--
Zinc	160.47	50	1E-06	0.25	250	8	70	2920	1.96E-05	3.00E-01	6.5E-05	2.24E-06	--	--
Organics														
1,1-DCE	0.0089	50	1E-06	0.25	250	8	70	2920	1.09E-09	9.00E-03	1E-07	1.24E-10	6.00E-01	7E-11
MC	0.0041	50	1E-06	0.25	250	8	70	2920	5.01E-10	6.00E-02	8E-09	5.73E-11	7.50E-03	4E-13
HCB	0.67	50	1E-06	0.25	250	8	70	2920	8.13E-08	8.00E-04	1E-04	9.30E-09	1.60E+00	1E-08
PAHs														
BA	2.36	50	1E-06	0.25	250	8	70	2920	2.88E-07	--	--	3.29E-08	7.30E-01	2E-08
BaP	1.50	50	1E-06	0.25	250	8	70	2920	1.83E-07	--	--	2.10E-08	7.30E+00	3E-07
B(b)Fl	2.94	50	1E-06	0.25	250	8	70	2920	3.60E-07	--	--	4.11E-08	7.30E-01	2E-08
B(k)Fl	1.50	50	1E-06	0.25	250	8	70	2920	1.83E-07	--	--	2.10E-08	7.30E-01	2E-08
Chrysene	1.59	50	1E-06	0.25	250	8	70	2920	1.94E-07	--	--	2.22E-08	7.30E-03	3E-10
Fluor.	2.57	50	1E-06	0.25	250	8	70	2920	3.14E-07	4.00E-02	5E-06	3.59E-08	--	0E+00
I(123-cd)P	1.54	50	1E-06	0.25	250	8	70	2920	1.89E-07	--	--	2.16E-08	7.30E-01	1E-07
Phenan.	10.21	50	1E-06	0.25	250	8	70	2920	1.25E-06	--	--	1.43E-07	--	0E+00
Pyrene	2.48	50	1E-06	0.25	250	8	70	2920	3.03E-07	3.00E-02	4E-05	3.47E-08	--	--
											0.01	6E-07		
TOTAL														

(a) Cancer intakes are divided by an averaging time of 25,550 days.

(b) Toxicity constants for chromium III were used to model exposures to total chromium.

(c) Chromium VI was assumed to be 1% of the total chromium concentration (Paustenbach et al., 1991).

### 3. RME SCENARIO: CURENT SECURITY WORKER SOIL INGESTION

(CS = UPPER-BOUND or MAXIMUM concentration of COPCs inside the fence only (n = 11), whichever is lower)

Chemical	UCL CS (mg/kg)	IR (mg/d)	CF (kg/mg)	FI	EF (d/yr)	ED (yr)	BW (kg)	AT (days)	Intake (mg/kg-d)	Chronic RfD (mg/kg-d)	Hazard Quotient	Cancer Intake(a) (mg/kg-d)	Slope Factor (mg/kg-d) <sup>-1</sup>	Cancer Risk
<b>(Metals)</b>														
Antimony	23.00	50	1E-06	0.13	250	8	70	2920	1.46E-06	4.00E-04	0.004	1.67E-07	--	--
Beryllium	1.87	50	1E-06	0.13	250	8	70	2920	1.19E-07	5.00E-03	2.4E-05	1.36E-08	4.30E+00	6E-08
Cadmium	55.7	50	1E-06	0.13	250	8	70	2920	3.54E-06	1.00E-03	3.5E-03	4.05E-07	--	0E+00
Cr (b)	887.96	50	1E-06	0.13	250	8	70	2920	5.65E-05	1.00E+00	5.6E-05	6.45E-06	--	--
Cr VI (c)	8.88	50	1E-06	0.13	250	8	70	2920	5.65E-07	5.00E-03	1.1E-04	6.45E-08	--	--
Copper	48.618	50	1E-06	0.13	250	8	70	2920	3.09E-06	3.70E-02	8.4E-05	3.53E-07	--	--
Lead	100.69	50	1E-06	0.13	250	8	70	2920	6.40E-06	---	---	7.32E-07	--	--
Mercury	0.1396	50	1E-06	0.13	250	8	70	2920	8.88E-09	3.00E-04	3.0E-05	1.01E-09	--	--
Selenium	1.468	50	1E-06	0.13	250	8	70	2920	9.34E-08	5.00E-03	1.9E-05	1.07E-08	--	--
Silver	2.97	50	1E-06	0.13	250	8	70	2920	1.89E-07	5.00E-03	3.8E-05	2.16E-08	--	--
Zinc	160.47	50	1E-06	0.13	250	8	70	2920	1.02E-05	3.00E-01	3.4E-05	1.17E-06	--	--
<b>Organics</b>														
1,1-DCE	0.0089	50	1E-06	0.13	250	8	70	2920	5.66E-10	9.00E-03	6E-08	6.47E-11	6.00E-01	4E-11
MC	0.0041	50	1E-06	0.13	250	8	70	2920	2.61E-10	6.00E-02	4E-09	2.98E-11	7.50E-03	2E-13
HCB	0.67	50	1E-06	0.13	250	8	70	2920	4.23E-08	8.00E-04	5E-05	4.83E-09	1.60E+00	8E-09
<b>PAHs</b>														
BA	2.36	50	1E-06	0.13	250	8	70	2920	1.50E-07	--	--	1.71E-08	7.30E-01	8E-09
BaP	1.50	50	1E-06	0.13	250	8	70	2920	9.54E-08	--	--	1.09E-08	7.30E+00	2E-07
B(b)Fl	2.94	50	1E-06	0.13	250	8	70	2920	1.87E-07	--	--	2.14E-08	7.30E-01	8E-09
B(k)Fl	1.50	50	1E-06	0.13	250	8	70	2920	9.54E-08	--	--	1.09E-08	7.30E-01	8E-09
Chrysene	1.59	50	1E-06	0.13	250	8	70	2920	1.01E-07	--	--	1.15E-08	7.30E-03	1E-10
Fluor.	2.57	50	1E-06	0.13	250	8	70	2920	1.63E-07	4.00E-02	3E-06	1.87E-08	--	0E+00
I(123-cd)P	1.54	50	1E-06	0.13	250	8	70	2920	9.81E-08	--	--	1.12E-08	7.30E-01	5E-08
Phenan.	10.21	50	1E-06	0.13	250	8	70	2920	6.49E-07	--	--	7.42E-08	--	0E+00
Pyrene	2.48	50	1E-06	0.13	250	8	70	2920	1.58E-07	3.00E-02	2E-05	1.80E-08	--	--
											0.01			3E-07

TOTAL

(a) Cancer intakes are divided by an averaging time of 25,550 days.

(b) Toxicity constants for chromium III were used to model exposures to total chromium.

(c) Chromium VI was assumed to be 1% of the total chromium concentration (Paustenbach et al., 1991).

4. RME SCENARIO: FUTURE WORKERS (8-YR EXPOSURE) SOIL INGESTION

(CS = UPPER-BOUND or MAXIMUM concentration of COPCs facility-wide (n = 20), whichever is lower)

Chemical	UCL CS (mg/kg)	IR (mg/d)	CF (kg/mg)	FI	EF (d/yr)	ED (yr)	BW (kg)	AT (days)	Intake (mg/kg-d)	Chronic RfD (mg/kg-d)	Hazard Quotient	Cancer Intake(a) (mg/kg-d)	Slope Factor (mg/kg-d) <sup>-1</sup>	Cancer Risk
<b>(Metals)</b>														
Antimony	19.89	50	1E-06	0.25	250	8	70	2920	2.43E-06	4.00E-04	0.006	2.78E-07	--	--
Beryllium	1.63	50	1E-06	0.25	250	8	70	2920	1.99E-07	5.00E-03	4.0E-05	2.28E-08	4.30E+00	1E-07
Cadmium	16.527	50	1E-06	0.25	250	8	70	2920	2.02E-06	1.00E-03	2.0E-03	2.31E-07	--	0E+00
Cr (b)	1320.00	50	1E-06	0.25	250	8	70	2920	1.61E-04	1.00E+00	1.6E-04	1.85E-05	--	--
Cr VI (c)	13.20	50	1E-06	0.25	250	8	70	2920	1.61E-06	2.00E-02	8.1E-05	1.85E-07	--	--
Copper	48.607	50	1E-06	0.25	250	8	70	2920	5.95E-06	3.70E-02	1.6E-04	6.79E-07	--	--
Lead	288.50	50	1E-06	0.25	250	8	70	2920	3.53E-05	---	--	4.03E-06	--	--
Mercury	0.247	50	1E-06	0.25	250	8	70	2920	3.02E-08	3.00E-04	1.0E-04	3.45E-09	--	--
Selenium	1.029	50	1E-06	0.25	250	8	70	2920	1.26E-07	5.00E-03	2.5E-05	1.44E-08	--	--
Silver	2.46	50	1E-06	0.25	250	8	70	2920	3.01E-07	5.00E-03	6.0E-05	3.44E-08	--	--
Zinc	435.22	50	1E-06	0.25	250	8	70	2920	5.32E-05	3.00E-01	1.8E-04	6.08E-06	--	--
<b>Organics</b>														
1,1-DCE	0.0054	50	1E-06	0.25	250	8	70	2920	6.54E-10	9.00E-03	7E-08	7.48E-11	6.00E-01	4E-11
MC	0.0032	50	1E-06	0.25	250	8	70	2920	3.91E-10	6.00E-02	7E-09	4.47E-11	7.50E-03	3E-13
HCB	2.32	50	1E-06	0.25	250	8	70	2920	2.84E-07	8.00E-04	4E-04	3.25E-08	1.60E+00	5E-08
<b>PAHs</b>														
BA	6.00	50	1E-06	0.25	250	8	70	2920	7.34E-07	--	--	8.39E-08	7.30E-01	2E-08
BaP	1.51	50	1E-06	0.25	250	8	70	2920	1.85E-07	--	--	2.11E-08	7.30E+00	3E-07
B(b)Fl	3.11	50	1E-06	0.25	250	8	70	2920	3.81E-07	--	--	4.35E-08	7.30E-01	2E-08
B(k)Fl	2.23	50	1E-06	0.25	250	8	70	2920	2.73E-07	--	--	3.12E-08	7.30E-01	2E-08
Chrysene	2.26	50	1E-06	0.25	250	8	70	2920	2.76E-07	--	--	3.16E-08	7.30E-03	7E-10
Fluor.	7.15	50	1E-06	0.25	250	8	70	2920	8.74E-07	4.00E-02	7E-06	9.99E-08	--	0E+00
I(123-cd)P	3.25	50	1E-06	0.25	250	8	70	2920	3.98E-07	--	--	4.54E-08	7.30E-01	1E-07
Phenan.	10.92	50	1E-06	0.25	250	8	70	2920	1.34E-06	--	--	1.53E-07	--	0E+00
Pyrene	6.34	50	1E-06	0.25	250	8	70	2920	7.76E-07	3.00E-02	4E-05	8.86E-08	--	--
<b>TOTAL</b>											0.009	6E-07		

(a) Cancer intakes are divided by an averaging time of 25,550 days.

(b) Toxicity constants for chromium III were used to model exposures to total chromium.

(c) Chromium VI was assumed to be 1% of the total chromium concentration (Paustenbach et al., 1991).

## 5. RME SCENARIO: HYPOTHETICAL FUTURE WORKERS (25-YR EXPOSURE) SOIL INGESTION

(CS = UPPER-BOUND or MAXIMUM concentration of COPCs facility-wide (n = 20), whichever is lower)

Chemical	UCL CS (mg/kg)	IR (mg/d)	CF (kg/mg)	FI	EF (d/yr)	ED (yr)	BW (kg)	AT (days)	Intake (mg/kg-d)	Chronic RfD (mg/kg-d)	Hazard Quotient	Cancer Intake(a) (mg/kg-d)	Slope Factor (mg/kg-d) <sup>-1</sup>	Cancer Risk
(Metals)														
Antimony	19.89	50	1E-06	1	250	25	70	9125	9.73E-06	4.00E-04	0.024	3.48E-06	--	--
Beryllium	1.63	50	1E-06	1	250	25	70	9125	7.97E-07	5.00E-03	1.6E-04	2.85E-07	4.30E+00	1E-06
Cadmium	16.527	50	1E-06	1	250	25	70	9125	8.09E-06	1.00E-03	8.1E-03	2.89E-06	--	0E+00
Cr (b)	1320.00	50	1E-06	1	250	25	70	9125	6.46E-04	1.00E+00	6.5E-04	2.31E-04	--	--
Cr VI (c)	13.20	50	1E-06	1	250	25	70	9125	6.46E-06	5.00E-03	1.3E-03	2.31E-06	--	--
Copper	48.607	50	1E-06	1	250	25	70	9125	2.38E-05	3.70E-02	6.4E-04	8.49E-06	--	--
Lead	288.50	50	1E-06	1	250	25	70	9125	1.41E-04	---	--	5.04E-05	--	--
Mercury	0.247	50	1E-06	1	250	25	70	9125	1.21E-07	3.00E-04	4.0E-04	4.32E-08	--	--
Selenium	1.029	50	1E-06	1	250	25	70	9125	5.03E-07	5.00E-03	1.0E-04	1.80E-07	--	--
Silver	2.46	50	1E-06	1	250	25	70	9125	1.21E-06	5.00E-03	2.4E-04	4.31E-07	--	--
Zinc	435.22	50	1E-06	1	250	25	70	9125	2.13E-04	3.00E-01	7.1E-04	7.60E-05	--	--
Organics														
1,1-DCE	0.0054	50	1E-06	1	250	25	70	9125	2.62E-09	9.00E-03	3E-07	9.35E-10	6.00E-01	6E-10
MC	0.0032	50	1E-06	1	250	25	70	9125	1.57E-09	6.00E-02	3E-08	5.59E-10	7.50E-03	4E-12
HCB	2.32	50	1E-06	1	250	25	70	9125	1.14E-06	8.00E-04	1E-03	4.06E-07	1.60E+00	6E-07
PAHs														
BA	6.00	50	1E-06	1	250	25	70	9125	2.94E-06	--	--	1.05E-06	7.30E-01	2E-07
BaP	1.51	50	1E-06	1	250	25	70	9125	7.38E-07	--	--	2.64E-07	7.30E+00	4E-06
B(b)F1	3.11	50	1E-06	1	250	25	70	9125	1.52E-06	--	--	5.44E-07	7.30E-01	3E-07
B(k)F1	2.23	50	1E-06	1	250	25	70	9125	1.09E-06	--	--	3.90E-07	7.30E-01	3E-07
Chrysene	2.26	50	1E-06	1	250	25	70	9125	1.10E-06	--	--	3.95E-07	7.30E-03	9E-09
Fluor.	7.15	50	1E-06	1	250	25	70	9125	3.50E-06	4.00E-02	3E-05	1.25E-06	--	0E+00
I(123-cd)P	3.25	50	1E-06	1	250	25	70	9125	1.59E-06	--	--	5.68E-07	7.30E-01	1E-06
Phenan.	10.92	50	1E-06	1	250	25	70	9125	5.34E-06	--	--	1.91E-06	--	0E+00
Pyrene	6.34	50	1E-06	1	250	25	70	9125	3.10E-06	3.00E-02	2E-04	1.11E-06	--	--
TOTAL											0.04			8E-06

(a) Cancer intakes are divided by an averaging time of 25,550 days.

(b) Toxicity constants for chromium III were used to model exposures to total chromium.

(c) Chromium VI was assumed to be 1% of the total chromium concentration (Paustenbach et al., 1991).

1. AVERAGE SCENARIO: HYPOTHETICAL FUTURE WORKER (25-YR EXPOSURE) SOIL INGESTION  
(CS = MEAN concentration of COPCs facility-wide (n = 20)).

	MEAN									Chronic		Cancer	Slope	
Chemical	CS	IR	CF	FI	EF	ED	BW	AT	Intake	RfD	Hazard	Intake(a)	Factor	Cancer
(Metals)	(mg/kg)	(mg/d)	(kg/mg)		(d/yr)	(yr)	(kg)	(days)	(mg/kg-d)	(mg/kg-d)	Quotient	(mg/kg-d)	(mg/kg-d)-1	Risk
Antimony	12.31	50	1E-06	1	250	25	70	9125	6.02E-06	4.00E-04	2E-02	2.15E-06	--	--
Beryllium	1.36	50	1E-06	1	250	25	70	9125	6.64E-07	5.00E-03	1E-04	2.37E-07	4.30E+00	1E-06
Cadmium	5.41	50	1E-06	1	250	25	70	9125	2.64E-06	1.00E-03	3E-03	9.44E-07	--	0E+00
Cr (b)	170.08	50	1E-06	1	250	25	70	9125	8.32E-05	1.00E+00	8E-05	2.97E-05	--	--
Cr VI (c)	0	50	1E-06	1	250	25	70	9125	0.00E+00	5.00E-03	0E+00	0.00E+00	--	--
Copper	42.45	50	1E-06	1	250	25	70	9125	2.08E-05	3.70E-02	6E-04	7.42E-06	--	--
Lead	89.054	50	1E-06	1	250	25	70	9125	4.36E-05	NA	--	1.56E-05	--	--
Mercury	0.14	50	1E-06	1	250	25	70	9125	6.65E-08	3.00E-04	2E-04	2.38E-08	--	--
Selenium	0.64	50	1E-06	1	250	25	70	9125	3.15E-07	5.00E-03	6E-05	1.13E-07	--	--
Silver	1.27	50	1E-06	1	250	25	70	9125	6.23E-07	5.00E-03	1E-04	2.23E-07	--	--
Zinc	164.72	50	1E-06	1	250	25	70	9125	8.06E-05	3.00E-01	3E-04	2.88E-05	--	--
(Organics)														
1,1-DCE	0.004	50	1E-06	1	250	25	70	9125	1.71E-09	9.00E-03	2E-07	6.12E-10	6.00E-02	4E-11
HCB	0.43	50	1E-06	1	250	25	70	9125	2.08E-07	8.00E-04	3E-04	7.43E-08	1.60E+00	1E-07
MC	0.002	50	1E-06	1	250	25	70	9125	1.17E-09	6.00E-02	2E-08	4.19E-10	7.50E-03	3E-12
PAHs														
BA	1.40	50	1E-06	1	250	25	70	9125	6.84E-07	--	--	2.44E-07	7.30E-01	2E-07
BaP	1.20	50	1E-06	1	250	25	70	9125	5.86E-07	--	--	2.09E-07	7.30E+00	2E-06
B(b)F1	2.39	50	1E-06	1	250	25	70	9125	1.17E-06	--	--	4.18E-07	7.30E-01	3E-07
B(k)F1	0.76	50	1E-06	1	250	25	70	9125	3.71E-07	--	--	1.32E-07	7.30E-01	1E-07
Chrysene	1.70	50	1E-06	1	250	25	70	9125	8.31E-07	--	--	2.97E-07	7.30E-03	2E-09
Fluor.	1.54	50	1E-06	1	250	25	70	9125	7.55E-07	4.00E-02	2E-05	2.70E-07	--	0E+00
I(123-cd)P	0.95	50	1E-06	1	250	25	70	9125	4.66E-07	--	--	1.66E-07	7.30E-01	1E-07
Phenan.	1.47	50	1E-06	1	250	25	70	9125	7.19E-07	--	--	2.57E-07	--	0E+00
Pyrene	1.47	50	1E-06	1	250	25	70	9125	7.19E-07	3.00E-02	2E-05	2.57E-07	--	0E+00
											0.02	3E-06		



**FINAL ECOLOGICAL RISK ASSESSMENT FOR THE  
CWMCS CHICAGO INCINERATOR FACILITY  
CHICAGO, ILLINOIS**

**FEBRUARY, 1995**

**Dames & Moore No. 13963-055**



**CHEMICAL WASTE MANAGEMENT SERVICES, INC. (CWMCS)**

**CHICAGO INCINERATOR FACILITY**

**FINAL RCRA FACILITY INVESTIGATION REPORT**

**RFI BASELINE ECOLOGICAL RISKS ASSESSMENT, APPENDIX P**

**ERRATA**

The following changes and corrections have been made to the Ecological Risk Assessment dated March 29, 1994, in response to USEPA comments listed in Attachment III of the June 3, 1994, submittal. These changes also appear in **bold type** in the revised document.

Section 1: Not altered.

Table 2-3: Tables was revised in accordance with General Comment 6.

Section 2.3, para 7: The following text was added in response to "The following COPCs detected in sediments were also detected in facility surface soils: antimony, beryllium, chromium, lead, mercury, zinc, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, methylene chloride, phenanthrene, and pyrene. While it is possible that the presence of some of these contaminants could have resulted from releases from the facility, it is important to keep in mind that numerous other sources of PAH releases into Lake Calumet have been identified. For example, samples taken from various landfill sites around Lake Calumet contained elevated levels of heavy metals and polycyclic aromatic hydrocarbons (PAHs) (IDENR, 1988). According to IDENR (1988), priority pollutants most likely to occur in Lake Calumet sediments include arsenic, cadmium, chromium, copper, lead, nickel, selenium, silver, zinc, DDT, dieldrin, PCBs, di-n-butyl phthalate, and PAHs."

Section 3.1, para 1: The reference EPA 1992a was changed to Barnthouse and Suter, 1986. Specific Comment 2.

Section 3.1.2, para 2: The following text was added in response to "Of the 13 Illinois state-listed T&E bird species that could potentially occur in the Lake Calumet area, five (yellow rail, black-crowned night heron, American bittern, red-shouldered hawk, and northern harrier) have been observed in the Lake Calumet area."

Section 3.1.2, para 3-4: These paragraphs were rewritten and expanded in response to General Comments 2 and 4.

"While some T&E bird species may land on, use, and feed on or from the facility, they are not likely to nest or substantial amounts of time on facility property or to be exposed to significant amounts of facility-related contaminants for the following reasons:

- They do not winter in the area.

- Their home range is large relative to the affected area.
- Most of the T&E birds species are associated with wetland areas, and no wetlands exist on facility property. The CWMCS facility consists of an artificial pier inhabited primarily by invader and early successional species. For example, although the black-crowned night heron does nest in the area, no wetlands where herons typically nest exist on the facility property.
- Releases from the facility, which have been primarily limited to small releases of facility-related contaminants into Lake Calumet, are not expected to contaminate wetland areas that exist in terrestrial areas north of the facility (i.e., away from Lake Calumet).

Given that suitable wetland areas occur near the facility that are not expected to be contaminated by facility releases, it is not reasonable to conclude that the T&E species listed in Table 3-1 would spend substantial amounts of time in areas affected by facility releases.

No federally-listed T&E species are known to occur within five miles of the facility. Five candidate avian species (the yellow rail, the black-crowned night heron, the American bittern, the red-shouldered hawk, and the northern harrier) have been observed within a five-mile radius of the facility, however. Some candidate species (the black tern, the common tern, and the black-crowned night heron) have been known to use and nest in wetlands within this five-mile radius. The nearest wetland that could be used by these species is located approximately 0.5 miles southeast of the facility. Although T&E bird species are not expected to be exposed to substantial amounts of facility-related contaminants for the reasons noted above, certain wetland species could potentially nest in wetlands located near the facility.

Section 3.3, para 1: General Comment 5. The following was added to clarify why uptake of COPCs across the gills was assumed to be the primary route of exposure for aquatic organisms. "While ingestion of sediments and prey may be important exposure pathways, any attempt to model the transfer of COPCs from sediments and prey to aquatic receptors would introduce significant uncertainties into the exposure assessment."

Section 3.4, para 2: Appendix 1 changed to Appendix A (Specific Comment 3).

Section 4, bullet 2: The following was added in response to Specific Comment 4. "In other words, is exposure to facility-related COPCs by aquatic organisms inhabiting Lake Calumet near the CWMCS pier likely to substantially alter species diversity or abundance?"

Section 5, para 3: The following was added in response to General Comment 7. "Since site-specific biota sampling was not done, it is not known for certain if sensitive species currently inhabit Lake Calumet near the CWMCS facility. Conversely, IDENR (1988) reported that in 1981 and 1982, various salmon and trout species, which are generally considered sensitive cold water species, were observed in Lake Calumet. These data indicate that Lake Calumet provides suitable habitat for sensitive cold water species."

Section 5.3, para 1: The following was added in response to General Comment 7. "The TQ approach was not used to eliminate COPCs. If the measured concentration of chemical in surface water (the exposure concentration referred to in Equation 5-1) is higher than the MATC (the Toxicity Reference Value identified in Equation 5-1), then the TQ for that chemical would be greater than 1."

Section 5.3.1, para 2: The following was added in response to Specific Comment 5. "Information on the mean, maximum, UCL, and standard deviation concentrations for toluene in surface water are listed in Table 3-4."

Section 5.3.1, para 2: The following was added in response to Specific Comment 6. "TQ results are presented and discussed in Chapter 7. Specifically, the measured concentration of toluene in surface water is compared to the MATC for toluene in Table 7-5."

Section 5.4, para 1: The following was added in response to Specific Comment 6. "Again, the TQ approach was not used to eliminate COPCs. If the measured or estimated concentration of a chemical in pore water or sediment (the exposure concentration referred to in Equation 5-1) is higher than the MATC (the Toxicity Reference Value identified in Equation 5-1), then the TQ for that chemical would be greater than 1. TQ results are presented and discussed in Chapter 7 (Risk Characterization)."

Section 5.5, para 1: The following was added in response to Specific Comment 7. "The final list of COPCs for surface water and sediment is summarized in Table 2-5, while the rationale for selecting the chemicals as COPCs for these media is described in Section 2."

Section 6.4, para 2: The following was added in response to Specific Comment 8. "A comparison of current species diversity with historical records shows a relative reduction in species diversity over time. IDENR (1988) reports that the current fish community in Lake Calumet, however, remains diverse. A score of 48 was calculated for Lake Calumet based on Karr's Index of Integrity (Karr, 1981), which is used to evaluate the quality of fish fauna. This score is comparable to scores obtained for the Fox River and falls within the "good" range (Greenfield and Rogner, 1984)."

Section 7.1, para 4: The following was added in response to General Comment 8. "To provide a less conservative portrayal of the potential toxicity of sediments to aquatic organisms, TQs were calculated using the arithmetic mean TRVs (MATCs) listed in Tables 5-4 and 5-5. Use of the minimum TRV may overestimate the true risk to aquatic receptors, since this approach assumes that all species inhabiting Lake Calumet are equally as sensitive to a given chemical as the most sensitive organism tested. Use of the arithmetic mean TRV may better reflect the varying susceptibilities of the myriad of aquatic organisms that may be exposed to facility-related COPCs."

Section 8, para 2: Sentence relating to acute effects was deleted as specified in Specific Comment 10.

Sections 9: No changes.

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## APPENDICES

Appendix A	Analytical Data Used to Establish Chemicals of Potential Concern and to Calculate Exposure-Point Concentrations for Aquatic Receptors
Appendix B	Toxicological Data Summary Tables of Effects in Pelagic and Benthic Organisms for the Chemicals of Potential Concern in Surface Water and Sediment

## 1.0 INTRODUCTION

CWM Chemical Services, Inc. (CWMCS) is performing a Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) at their Chicago Incinerator facility. The RCRA Corrective Action Plan for the facility was developed as part of a Consent Judgment between CWMCS and the USEPA in response to a RCRA Facility Assessment (RFA) performed by the Illinois Environmental Protection Agency (IEPA). The RFI will assess the distribution of potentially hazardous constituents released from former solid waste management units (SWMUs) into air, soils, groundwater, and surface water at or near the facility. The Baseline Risk Assessment (Baseline RA) portion of the RFI will quantify the potential level of risk, if any, to potential human and ecological receptors. The primary objective of the Baseline RA is to determine if historical releases from these former SWMUs pose a potential threat to human health or the environment. This Baseline RA includes both a human health risk assessment (HHRA) and an ecological risk assessment (ERA).

This report presents the findings of the Ecological Risk Assessment (ERA) conducted for the CWMCS Chicago Incinerator facility. The HHRA has been submitted under separate cover (CWMCS, 1994). This ERA is an investigation of potential threats to the environment from exposure to chemicals of potential concern (COPCs) present in the vicinity of the CWMCS facility. It identifies potential exposure pathways from contaminants to environmental receptors inhabiting or occurring in the area, characterizes the ecotoxicological properties of the COPCs, and quantifies the extent to which such exposures could potentially contribute to ecological risk.

Risk assessment provides a mechanism for estimating the probability that ecological receptors may experience adverse effects. It is a process that synthesizes available data on exposure and toxicity of the COPCs and incorporates scientific and professional judgment to estimate the associated risk to the environment. Ecological risk assessment essentially involves four steps:

1. **Data Collection and Evaluation:** identifying COPCs and defining the nature and extent of contamination in specific environmental media;



2. **Exposure Assessment:** determining the extent of ecological exposure to COPCs;
3. **Effects Assessment:** determining the relationship between magnitude of exposure and the probability of occurrence of adverse effects; and
4. **Risk Characterization:** combining the first three steps to characterize potential ecological risks.

The first step in the ERA is to identify COPCs. This step is followed by an evaluation of potential exposure pathways and quantification of exposures by key receptor species. To quantify exposures, exposure concentrations must be estimated. The next step, effects assessment, identifies compounds that may cause adverse effects in exposed populations. The final step, risk characterization, integrates field data, information from the exposure and effects assessments, and other relevant data from the literature to yield quantitative estimates of risk. Since uncertainty analysis is considered an important component of the risk assessment process, a detailed qualitative discussion of uncertainty is included. Guidance documents used to conduct this ERA include USEPA's *Framework for Ecological Risk Assessment* (EPA, 1992a), EPA's *Ecological Assessment at Hazardous Waste Sites* (EPA, 1989a), *Ecological Assessment of Hazardous Waste Sites: A Field and Laboratory Reference Document* (EPA, 1989b), *Risk Assessment Guidance for Superfund, Volume II, Environmental Evaluation Manual* (EPA, 1989c).

### 1.1 Facility Background

The CWMCS Chicago Incinerator facility is located on approximately 30 acres of land on the eastern shore of Lake Calumet within the City of Chicago, Cook County, Illinois. Figure 1-1 shows the general location of the facility. The incinerator complex occupies the southeast portion of the facility. Directly north of this complex is the employee parking lot and a vacant area. The pier, which extends approximately 2,300 feet southwest from the vacant area into Lake Calumet, comprises the remainder of the facility. The area surrounding the facility is zoned heavy industrial and is used almost exclusively for waste management operations. Directly to the east, across the street from this facility, is the Paxton II Landfill. The Paxton II Landfill was a solid and non-hazardous special waste landfill that used a trench system for

waste burial. The facility stopped receiving wastes in early 1992 pursuant to legal action by the State of Illinois. To the southeast, across the street from the CWMCS facility and immediately south of the Paxton II Landfill, is the operating Land & Lakes Landfill. Immediately to the east of the Land & Lakes Landfill is the Paxton Avenue Lagoons site, which is undergoing remediation by the State of Illinois. Adjacent to the CWMCS facility on the south side is the Clean Harbors of Chicago, Inc. facility, which uses chemical processes to remove heavy metals and suspended solids from aqueous and organic waste streams.

Lake Calumet is located about 15 miles south of downtown Chicago. Industrial development, primarily iron and steel manufacturing, around Lake Calumet began in 1869. By 1913, five metal processing industries were located on the west side of Lake Calumet. Untreated liquid wastes were discharged into Lake Calumet, and solid wastes were dumped on adjacent vacant land. Some industries sought to improve their property by filling in the wetlands with solid waste, primarily slag and/or dredge materials from Lake Calumet. Eventually, some 300 acres were developed in this manner (IDENR, 1988). In 1940, the City of Chicago built a dike at 110th Street across from Lake Calumet to provide open space for solid and industrial waste disposal. In 1986, the IEPA found that untreated leachate from this waste disposal unit was flowing into area surface water bodies, including Lake Calumet. Additionally, samples taken from various landfill sites around Lake Calumet contained elevated levels of heavy metals and polycyclic aromatic hydrocarbons (PAHs) (IDENR, 1988).

After a century of industrialization, the size and shape of Lake Calumet has been drastically altered. Land use on the east side of Lake Calumet consists primarily of waste treatment and disposal facilities, while the Calumet Expressway (Interstate 94) and a ditch (Pullman Creek) which conveys surface runoff from the expressway and nearby industries adjoin the west side. In addition to the effects of over 100 years of industrialization, Lake Calumet is currently impacted by a variety of non-point sources, including highway runoff, surface runoff from industrial properties, and seepage of contaminated groundwater from nearby landfills, waste lagoons, and underground storage tanks (IDENR, 1988). A 1986 IEPA study of Southeast Chicago showed that the land area and Lake Calumet contamination may stem from thirty-one operating or closed landfills or other waste management units in the area, including steel mills,

chemical plants, auto assembly plants, and hazardous waste disposal facilities. In summary, Lake Calumet has been exposed to a wide variety of industrial contaminants for over 100 years. Priority pollutants most likely to occur in Lake Calumet sediments include arsenic, cadmium, chromium, copper, lead, nickel, selenium, silver, zinc, DDT, dieldrin, PCBs, di-n-butyl phthalate, and PAHs (IDENR, 1988).

## **1.2 Historical Facility Operations**

Until the late 1920's, Lake Calumet extended beyond its current borders. Construction of the Cal-Sag Canal and the associated flood control units allowed some drainage. Many of these reclaimed lands were filled with construction debris, wood, slag, and soil. Most of the area occupied by the present day CWMCS facility remained under water until the early 1960's when a railroad was constructed along the eastern shore of Lake Calumet. The area of the facility containing the current incinerator complex was subsequently constructed using fill, followed by the construction of the pier in the early 1970's.

In 1971, Hyon Waste Management, Inc. (Hyon) constructed an incinerator, office building, and a control building on the property. Hyon operated the waste treatment facility until 1979 when the equipment and permits were purchased by SCA Chemical Services, Inc. (SCA). The Hyon operation was to include the incineration of liquid and hazardous wastes and the neutralization and biological treatment of aqueous hazardous waste. From 1972 to 1976, about 68 million gallons of chemical wastes were treated at the plant. About 10% of this waste was incinerated, while the remainder was treated. Nine former SWMUs have been identified by USEPA: two wastewater basins, the high solids basin, the biobeds, the biochemical treatment area, the chemical treatment area, the concrete activated sludge basins, the underground pipe network, and the drum handling area. A tenth SWMU, the Hyon Tank Farm, was identified during the Work Plan preparation for this RFI. The location of the former Hyon SWMUs is shown in Figure 1-2.

The facility permit was transferred to SCA in November, 1980. In 1981 under the direction of IEPA, SCA constructed a clay-lined vault on the western portion of the pier. Excavation and

solidification of waste materials present in other SWMUs was accomplished and placed in the vault. Excavated basins were backfilled and covered with innocuous fill. Subsequently, portions of the underground pipe network were abandoned (plugged with concrete) in place. CWMCS acquired the facility in 1985, and in 1988 began a detailed surface water, sediment, soil, and subsurface investigation of the facility to further characterize potential releases of contaminants from the former SWMUs as part of this RFI. Details on past and current facility conditions are available in the RCRA Facility Investigation Report (CWMCS, 1993).

### **1.3 Study Area Description**

A detailed description of the facility, both past and current conditions, is contained within the RCRA Facility Investigation Report (CWMCS, 1993). A summary of pertinent information is offered here. The CWMCS facility is located in the Chicago Lake Plain, which is very flat and has few streams but many marshland and wetland areas near Lake Calumet. The area of the CWMCS facility is not located within a 100-year floodplain, according to the flood insurance rate maps prepared by the Federal Emergency Management Agency (dated June 1, 1981), and no natural streams or wetland areas occur on the facility. Most of the facility was under water until the early 1960's when a railroad was constructed along the eastern shore of Lake Calumet on fill materials, which included construction debris, slag, and soil. The active area of the facility (i.e., the area containing the incinerator complex) and the remainder of the pier area were constructed in the early 1970's.

#### **1.3.1 Description of the Plant Community**

Vegetation within the area of the facility consists primarily of invader and weedy species that form a mosaic in response to varying facility conditions. A variety of habitats is provided by different soil moisture regimes and disturbance histories. Wet habitats are marked by dense stands of reed grass (*Phragmites australis*) that occur at the edge of open water. Poorly drained areas contain water cress (*Nasturtium officinale*), dock (*Rumex* spp.), milkweed (*Aesclepias*

spp.), and purslane (*Portulaca oleracea*). Better drained areas, which appear to have been recently disturbed, contain dense stands of goldenrod (*Solidago* spp.), fleabane or daisy (*Erigeron* spp.), annual sunflower (*Helianthus annuus*), and pigweed (*Amaranthus* spp.) Some areas on the north side of the property support big bluestem (*Andropogon gerardii*). Scattered cottonwood trees (*Populus* spp.) and sumac (*Rhus* spp.) occur along the property fence, with scattered bittersweet (*Solanum dulcamara*). A few areas are devoid of vegetation except for stands of Russian thistle (*Salsola kali*). Most of the facility has been recently disturbed or has soil conditions (*i.e.*, compacted gravel) that are not conducive to vegetative growth.

Plant species listed as threatened or endangered (T&E) by the State of Illinois that could occur in the area of the facility but do not occur on-site include Small White Lady's Slipper (*Cypripedium canadum*), Little Green Sedge (*Carex viridula*), Fewflower Spike Rush (*Eleocharis pauciflora*), and Richardson Rush (*Juncus alpinus*) (personal communication, letter, from Deanna Glosser, Illinois Department of Conservation, October, 1993).

### 1.3.2 Description of Aquatic Populations

Biosurvey data for Lake Calumet was collected in 1981 and 1982 (IDENR, 1988). Twenty-seven fish species from 10 families were collected. A comparison of more recent diversity data with historical records shows that species diversity in Lake Calumet has decreased over time, although the current Lake Calumet fish community remains diverse. The more frequently occurring sport fish species include bluegill (*Lepomis macrochirus*), largemouth bass (*Micropterus salmoides*), and yellow perch (*Perca flavescens*). Common carp (*Cyprinus carpio*), goldfish (*Carassius auratus*), and various minnows (Family Cyprinidae) have also been collected in Lake Calumet and associated wetlands. Other fish species collected include shiners (*Notropis* sp.), salmon and trout (*Oncorhynchus* sp.), catfish and bullheads (*Ictalurid* sp.), darters (*Etheostoma* sp.), and drums (*Aplodinotus* sp.) (IDENR, 1988).

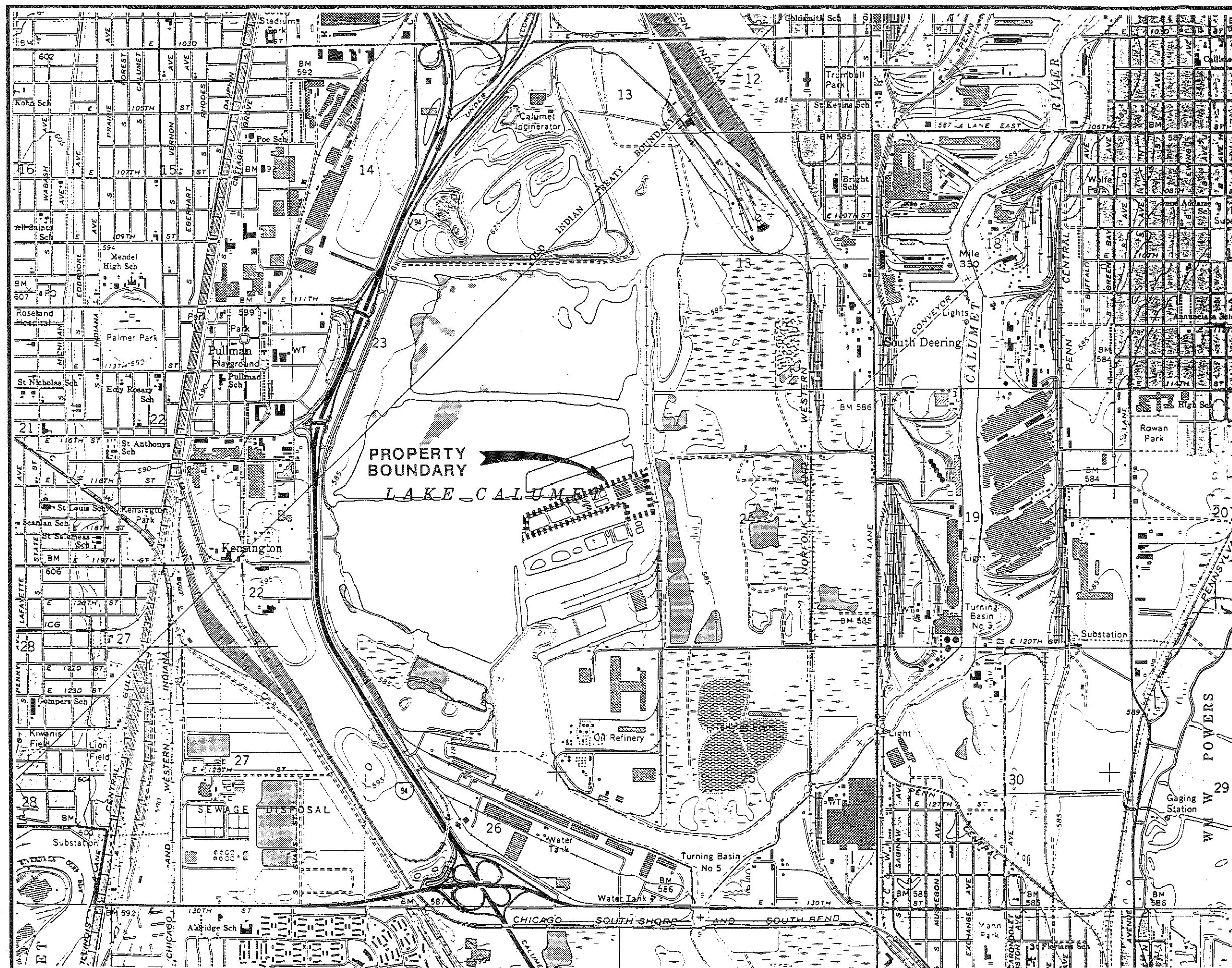
### 1.3.3 Description of Terrestrial Populations

No federal or state-listed T&E bird species have been observed on-site, nor are they expected to occur due to the conditions of the fill material and the lack of mature vegetative growth as described above. Bird species potentially occurring in the Lake Calumet area include the following 13 species listed as endangered by the State of Illinois (personal communication from Deanna Glosser, Illinois Department of Conservation, October, 1993 and IDENR, 1988): the pied billed grebe (*Podilymbus podiceps*), the black-crowned night heron (*Nycticorax nycticorax*), the common moorhen (*Gallinula chloropus*), the upland sandpiper (*Bartramia longicauda*), Wilson's phalarope (*Phalaropus tricolor*), the black tern (*Chlidonas niger*), the yellow-headed blackbird (*Xanthocephalus xanthocephalus*), the great egret (*Casmerodius albus*), the least bittern (*Ixobrychus exilis*), the American bittern (*Botaurus lentiginosus*), the yellow rail (*Coturnicops noveboracensis*), the red-shouldered hawk (*Buteo lineatus*), and the northern harrier (formerly known as the marsh hawk) (*Circus cyaneus*).

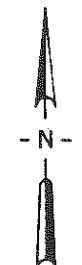
Cormorants were observed in wetland areas located approximately one-half mile east of the facility during field reconnaissance of the facility conducted in the fall of 1993. Other non-endangered bird species potentially inhabiting or frequenting Lake Calumet include water fowl, such as ducks and geese, and shorebirds, including killdeer and gulls. Other avian receptors would include various passerine (or perching) birds that typically occur in developed or urban/suburban environments. These species may include black birds, starlings, jays, swallows, larks, and sparrows. In addition, the CWMCS facility has been used by migrant populations of gulls, primarily herring gulls. The gulls utilize the pier seasonally for nesting and fledgling their young. The isolation afforded by the fence and surrounding water provides a hospitable area for the breeding gulls.

The CWMCS facility provides limited potential habitat for small mammals, such as rodents (mice, rats, and voles). The CWMCS facility is constructed on a man-made pier that has become vegetated with invader-type plant species typical of an early successional community. As such, habitat for a majority of the indigenous small mammal species is limited or non-existent. Similarly, large mammals are not likely to frequent the facility. The eastern portion of the facility is enclosed by a tall chain-link security fence. The fence essentially isolates approximately one-half of the pier and encloses the remainder of the pier from large mammal

encroachment.



BASE MAP SOURCE:  
 USGS 7.5 MINUTE TOPOGRAPHIC  
 QUADRANGLE, LAKE CALUMET,  
 ILLINOIS-INDIANA, DATED 1965,  
 PHOTOREVISED 1973,  
 PHOTOINSPECTED 1977.



FEB. 23 1995

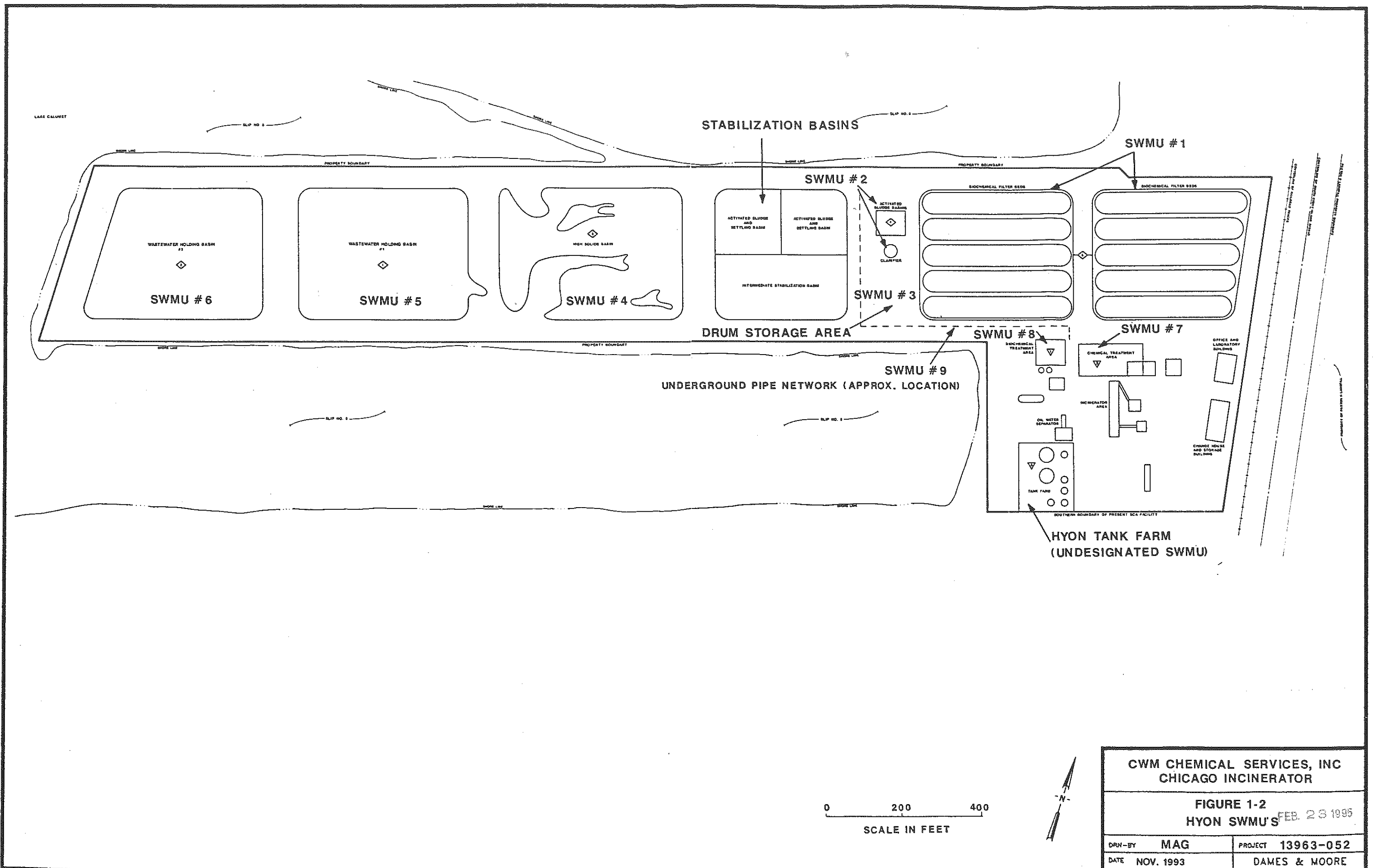
SCALE: 1"=2000'

CWM CHEMICAL SERVICES, INC.  
 CHICAGO INCINERATOR

FIGURE 1-1  
 REGIONAL LOCATION MAP

DRN-BY SLH	PROJECT 13963-055
DATE NOV. 1993	DAMES & MOORE





CWM CHEMICAL SERVICES, INC CHICAGO INCINERATOR			
FIGURE 1-2 HYON SWMU'S FEB. 28 1995			
DRW-BY	MAG	PROJECT	13963-052
DATE	NOV. 1993	DAMES & MOORE	

## 2.0 IDENTIFYING CHEMICALS OF POTENTIAL CONCERN

After collecting and analyzing environmental samples from the facility area, the next step in the risk assessment process is to identify chemicals of potential concern (COPCs). COPCs are compounds present in environmental media in the vicinity of the CWMCS facility that are site-related and may pose adverse impacts to ecological receptors. A phased screening process was used to identify COPCs in environmental media that may pose adverse impacts to environmental receptors (i.e., COPCs for the human health and ecological risk assessments may be different). COPCs were determined for the following media for this ERA:

- Lake Calumet sediment
- Lake Calumet surface water

It was not necessary to determine COPCs for groundwater since it does not surface anywhere on-site, and aquatic receptors are not exposed directly to undiluted groundwater. Although shallow groundwater present in the fill is hydraulically connected to Lake Calumet, groundwater flow to Lake Calumet is slow and does not significantly impact Lake Calumet water levels. A worst-case scenario, based on observed hydrogeology and groundwater chemistry conditions at the CWMCS pier, was modeled to simulate the flux of benzene into Lake Calumet. Results showed that the actual discharge of benzene was very low (see Section 4.2.5 of the RFI; CWMCS, 1993). Furthermore, since chemical levels in Lake Calumet and groundwater within the fill are probably at steady-state given that the contaminated materials have been present on the facility for more than 20 years, future chemical levels in surface water and sediment near the facility are not expected to increase over time. Finally, COPCs for surface soil and air were not identified for ecological risk quantification, since the focus of this assessment is on impacts to aquatic receptors.

## 2.1 Phased Screening Process

The selection of COPCs was based on the following data. The data validation packages (Appendix N) had primacy in the review, which is consistent with guidance from EPA Region V. ETC Analytical Data Packages upon which the data validation was conducted were used to derive numerical values for data points listed as "BMDL" (Below Method Detection Limit) in the data validation packages. The ETC Analytical Data Packages did not list numeric values for positive readings ("hits") that were below the method detection limit (MDL) [ETC's MDL is the sample quantitation limit (SQL)]. Since analytical results reported as BMDL were not validated, they were not used in this assessment. For data points reported as BMDL, that sample concentration was assumed to be equal to one-half the SQL. Similarly, numeric values reported as non-detected in the data validation process were also assumed to be equal to one-half the SQL.

Selection of COPCs in surface water and sediments involved a four-phase process. In the first phase, the concentration of chemicals detected in blanks were compared with the concentration detected in facility samples. In accordance with USEPA risk assessment guidance, sample results were considered positive only if the concentration in the facility sample was five times the maximum concentration detected in any blank sample [10 times the maximum for the common laboratory artifacts: acetone, methyl ethyl ketone, methylene chloride, toluene, and phthalate esters (USEPA, 1989d)]. The second phase included an evaluation of detection frequencies. Compounds with detection frequencies of five percent or less in facility-related samples from any medium were eliminated from further consideration in that medium.

The third phase involved comparing the measured concentration of chemicals in sediments to medium-specific baseline data. Contaminants not eliminated as COPCs for sediment during the first two phases of the screening process were compared to measured contaminant levels in clay. Clay samples collected from the CWMCS facility during the Phase II investigation were used in these comparisons. Clay samples are appropriate for baseline comparisons because studies conducted in the Lake Calumet area (IDENR, 1988) have shown that Lake Calumet sediments

have been contaminated by past land use and waste disposal activities. Consequently, clay samples represent baseline conditions prior to waste disposal activities either on the facility or in the vicinity of the property. Furthermore, since the pier is built on land that was reclaimed from Lake Calumet, the clay samples used to represent baseline conditions are virtually identical to the clay that is beneath existing Lake Calumet sediments.

Clay samples collected during Phase II of the facility investigation indicate that contamination from historical waste disposal activities has not migrated vertically. Twenty-three samples were collected at depths of five, 15, and 40 feet below the clay/fill contact. A total of seven volatile organic compounds (VOCs) and two phthalates were detected in the Phase II clay samples. Four of these VOCs (acetone, methylene chloride, methyl ethyl ketone, and trichlorofluoromethane) and one of the phthalates (bis(2-ethylhexyl)phthalate) are common laboratory artifacts. The upper samples (i.e., the samples collected at a depth of five feet below the clay/fill interface) contained no VOCs. This upper layer (the upper lacustrine unit) has been shown to be a homogenous, low permeability layer. This contaminant configuration indicates that vertical migration of contaminants from the fill has not occurred. The low levels of VOCs detected in samples taken from the lower lacustrine layer (15 feet below the interface) and the underlying clayey glacial till (40 feet below the interface) are believed to be sampling artifacts introduced by the "drag down" of surficial soil contaminants during sampling. Metals were commonly measured in clay samples. The preponderance of metals throughout the clay and the fact that similar concentrations were measured at the different levels sampled indicate that measured levels represent naturally-occurring concentrations. Table 2-1 is a list of metal and organic constituents in collected clay samples. As a result of this process, potential hazards associated with exposure to only those chemicals present in sediments near the CWMCS facility in concentrations significantly greater than baseline were evaluated. This approach agrees with the following USEPA guidance, "All chemicals detected at concentrations exceeding background should be considered in the risk assessment" (Letter from Joseph M. Boyle to Kevin K. Hersey, May 15, 1992).

If the mean concentration of a chemical in sediment samples collected adjacent to the CWMCS pier was statistically higher (at the 95% level of confidence) than the mean level of that contaminant in facility clay samples as determined using a one-tailed Student t-test, that chemical was retained as a COPC. If a given chemical was not detected in clay but was detected in sediments, that chemical was considered a COPC. Since Lake Calumet has been contaminated by historical releases from numerous activities and locations, collection of baseline samples for surface water was not possible. Therefore, any chemical detected in surface water not eliminated as a COPC during the first two phases of the screening process was retained as a COPC for surface water.

## 2.2 COPCs for Surface Water

Five surface water samples were collected during Phase I of the investigation, while 15 surface water samples were collected during Phase II. As was done in the HHRA, Phase I and II data were combined to increase sample size. The locations of Phase I and Phase II surface water samples are shown in Figure 3-1. Phase I surface water samples were analyzed for priority pollutant volatiles, metals, and semi-volatiles common to Appendix IX plus total dissolved solids (TDS), total suspended solids (TSS), biological oxygen demand (BOD), chemical oxygen demand (COD), total alkalinity, total organic carbon (TOC), specific conductance, pH, ammonia, nitrates and nitrites, potassium, sodium, calcium, magnesium, and sulfate. Phase II samples were analyzed for priority pollutant volatiles, metals, and semi-volatiles common to Appendix IX.

Only two chemicals, methylene chloride and toluene (common laboratory artifacts), were detected in more than five percent of the surface water samples analyzed. Methylene chloride was eliminated as a COPC since it was detected in blank samples at similar concentrations (i.e., within ten times of the blank concentrations). Any sample whose concentration did not exceed the sample quantitation limit (i.e., non-detect and BMDL samples) were considered as non-detects in determining detection frequency for constituents in surface water. Detection frequencies were 32 percent for methylene chloride and 11 percent for toluene. The maximum

concentration of these two chemicals in surface water ranged from 4.1  $\mu\text{g/L}$  for toluene to 9.1  $\mu\text{g/L}$  for methylene chloride.

### 2.3 COPCs for Sediment

Thirty sediment samples were collected from Lake Calumet during Phase I activities (sample S-6 was not sampled due to a lack of sediments at that location). Phase I sediment samples were analyzed for priority pollutant volatiles, metals, and semi-volatiles common to Appendix IX plus COD, pH, ammonia, nitrates and nitrites, potassium, sodium, magnesium, calcium, and sulfate. Ten sediment samples, which were analyzed for Appendix IX pollutants, were collected from Lake Calumet during Phase II of the investigation. The location of sediment samples collected during Phases I (samples S-1 through S-30) and II (samples S-1 through S-10) are shown in Figure 3-1. All Phase I and II sediment samples collected site wide were used in this assessment with the following exceptions. Phase I sample S-24 was judged to be unreliable for all constituents in the data validation process and was not used. Phase I samples S-13 and S-16 were judged to be unreliable in the data validation process for acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(ghi)perylene, bis(2-ethylhexyl)phthalate, chrysene, di-n-butyl phthalate, fluoranthene, fluorene, indeno(123-cd)pyrene, naphthalene, phenanthrene, phenol, and pyrene. Hence, the effective sample size for these organics was 36. Phase I sample S-10 was not analyzed for benzene, 1,2-trans-dichloroethylene, diethyl phthalate, methylene chloride, and toluene. Hence, sample size for these organics was 38. Sample size for heptachlor was 28, since in addition to the loss of Phase I sample S-24, Phase II sediment samples were not analyzed for heptachlor.

Metals detected in Lake Calumet sediments include: antimony, arsenic, beryllium, cadmium, chromium, copper, lead, mercury, nickel, silver, and zinc. Any sample whose concentration did not exceed the sample quantitation limit (i.e., non-detect and BMDL samples) were considered as non-detects in determining detection frequency for both metals and organic constituents in sediment. Arsenic, beryllium, cadmium, chromium, copper, lead, nickel, and zinc were detected in at least 90% of the 38 Phase I and II samples. Antimony, mercury, and

silver were detected in 28%, 51%, and 21% of the samples analyzed, respectively. Maximum metals levels ranged from 340  $\mu\text{g/kg}$  for mercury to 1,550,000  $\mu\text{g/kg}$  for zinc.

Organic contaminants detected in Lake Calumet sediment samples taken near the CWMCS facility include: acenaphthene, anthracene, benzene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(ghi)perylene, bis(2-ethylhexyl)phthalate, chrysene, 1,2-trans-dichloroethylene, di-n-butyl phthalate, diethyl phthalate, fluoranthene, fluorene, heptachlor, indeno(123-cd)pyrene, methylene chloride, naphthalene, phenanthrene, phenol, pyrene, and toluene. Of these 23 organic compounds, only fluoranthene and pyrene were detected in more than 80% of the samples collected. Chrysene, methylene chloride, and phenanthrene were detected in 54% to 76% of the samples analyzed. Anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, bis(2-ethylhexyl)phthalate, di-n-butyl phthalate, and phenol were detected in 30% to 50% of the samples. The remaining chemicals [acenaphthene (16%) benzene (18%), benzo(k)fluoranthene (24%), benzo(ghi)perylene (11%), 1,2-t-dichloroethylene (26%), diethyl phthalate (24%), fluorene (24%), heptachlor (14%), indeno(123-cd)pyrene (8%), naphthalene (27%), and toluene (13%)] were detected in less than 30% of the sediment samples collected. Maximum measured levels of organics in sediments ranged from 3.0  $\mu\text{g/kg}$  dry weight for toluene to 17,900  $\mu\text{g/kg}$  dry weight for di-n-butyl phthalate.

Since sediment samples were taken both near the CWMCS pier and out into Lake Calumet, unpaired, one-sided Student's t tests were performed to determine if the measured concentration of chemicals in sediment near the facility was statistically different from the concentration in sediment samples taken farther out in Lake Calumet. This evaluation was done for the purpose of determining whether the data could be pooled prior to further analysis. "Lake Calumet" samples were defined as Phase I samples S-1 through S-6 (S-6 was not sampled due to insufficient sample volume) and S-17 through S-22. "Near-pier" samples were defined as all others. The location of Lake Calumet and near-pier samples is shown on Figure 3-1.

Results of the t-test show that the concentrations of beryllium, cadmium, chromium, copper, lead, mercury, nickel, diethyl phthalate, phenanthrene, and pyrene in sediments near the CWMCS facility are significantly higher than the concentration of these chemicals in sediments taken further out in Lake Calumet (Table 2-2). Levels of antimony, arsenic, benzene, and phenol were higher in Lake Calumet sediments versus near-pier sediment samples, while there was no significant difference in levels of the remaining 21 constituents detected in sediments (Table 2-2). Based on these results, the exposure point concentrations used in the effects assessment and data used in additional statistical analyses were based on samples taken from near the CWMCS pier only. This approach is conservative in that it avoids dilution of the mean and upper-bound concentrations used in the toxicity evaluation by the slightly lower concentration of chemicals measured farther out in Lake Calumet for some chemicals of potential concern and is more representative of the levels to which aquatic receptors inhabiting areas near the CWMCS facility may potentially be exposed.

Next, the distribution of the near-pier sediment data were determined. Most large environmental data sets have been shown to be lognormally versus normally distributed (USEPA, 1992c). A Kolmogorov-Smirnov (K-S) goodness of fit test using Lilliefors correction was used to determine if the data were normally or lognormally distributed. The K-S test was selected over the Shapiro-Wilk (or W) test, as it is a more powerful and robust statistical tool (Gilbert, 1987). The data were assumed to fit the distribution (normal or lognormal) if the results of the K-S test were significant at the 95% level of confidence. Results of the K-S test are shown in Table 2-3 for each chemical detected in sediments. Table 2-3 shows that arsenic, chromium, copper, lead and zinc are lognormally distributed, while beryllium and cadmium are normally distributed. The data available for the remaining 22 constituents did not fit any distribution at the 95% level of significance. If the data fit neither a normal nor a lognormal distribution (i.e., those labeled as "none" in Column 2 of Table 2-3), then the data were assumed to fit the distribution that yielded the higher upper-bound (upper 95% percentile) value. Section 3.4 provides the equations and data used to calculate upper-bound values.



Table 2-4 presents results of the t-tests done to compare measured levels of contaminants in near-pier sediment samples with those in the clay samples obtained from the facility. Results of the t-test were considered significant at the 95% level of confidence regardless of whether chemical levels in clay were statistically higher. If the mean concentration of a chemical in clay was statistically higher than its mean concentration in sediment (at the 0.05 level of confidence), that chemical was not considered a COPC. If the data for a given chemical were shown to be lognormally distributed, the t-test was done using logtransformed data [i.e.,  $\ln(x)$ ]. Table 2-4 shows that levels of benzene, bis(2-ethylhexyl)phthalate, cadmium, copper, di-n-butyl phthalate, nickel, and toluene in sediment samples collected near the CWMCS facility were either significantly lower than or not significantly different from levels measured in baseline (clay) samples. Hence, arsenic, beryllium, chromium, lead, mercury, phenanthrene, silver, and zinc were retained as COPCs. Since acenaphthene, anthracene, antimony, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, 1,2-trans-dichloroethylene, diethyl phthalate, fluoranthene, fluorene, heptachlor, indeno(123-cd)pyrene, methylene chloride, phenol, and pyrene were not detected in at least five percent of the clay samples analyzed but were detected in near-pier sediments, these chemicals were also retained as COPCs for sediments. Table 2-5 summarizes COPCs for surface water and sediments. A statistically significant increase in sediment chemical concentrations in the "near pier" samples versus clay samples does not necessarily imply the chemicals were released from any particular source. The following COPCs detected in sediments were also detected in facility surface soils: antimony, beryllium, chromium, lead, mercury, zinc, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, methylene chloride, phenanthrene, and pyrene. While it is possible that the presence of some of these contaminants could have resulted from releases from the facility, it is important to keep in mind that numerous other sources of PAH releases into Lake Calumet have been identified. For example, samples taken from various landfill sites around Lake Calumet contained elevated levels of heavy metals and polycyclic aromatic hydrocarbons (PAHs) (IDENR, 1988). According to IDENR (1988), priority pollutants most likely to occur in Lake Calumet sediments include arsenic, cadmium, chromium,

copper, lead, nickel, selenium, silver, zinc, DDT, dieldrin, PCBs, di-n-butyl phthalate, and PAHs.

## 2.4 Environmental Fate Characteristics of COPCs

Environmental fate properties are important because they provide information on the environmental behavior of chemical compounds throughout various environmental media. Environmental fate properties for the COPCs are summarized in Table 2-6. Many physical and chemical parameters, such as water solubility, vapor pressure, octanol-water partitioning, and bioaccumulation, influence the behavior and fate of organics released into the environment. The importance of these factors and how they influence each other is often inadequately understood. However, the examination of a few basic physicochemical properties can provide insight into the behavior and fate of chemicals released into the environment.

Metals readily sorb to particulate matter and may complex with various anions such as carbonates and sulfides, modifying their water solubility. Such sorption and complexation is known to affect (typically diminish) the bioavailability of metals in soils/sediments or aqueous systems (Adams, 1988). The empirical soil/sediment-water distribution coefficient ( $K_d$ ), which is defined as the equilibrium concentration of that individual compound in soil/sediment divided by the equilibrium concentration of that compound in the aqueous phase, is used to estimate the partitioning behavior of metals in aqueous systems.  $K_d$  values were used as general guidance on partitioning because specific sediment characteristics that could influence metals behavior, such as redox potential, particle size distribution, and acid volatile sulfide data are not known for this facility. Generally, the higher the  $K_d$  value, the more likely the metal is to sorb to sediment and the less likely it is to partition into water and become bioavailable.  $K_d$  values can be highly variable depending on facility-specific sediment conditions. The range of observed  $K_d$  values (as reported by Boes, *et al.*) for the metals of potential concern are shown in Table 2-7. Geometric mean  $K_d$  values for the metals of potential concern range from 0.55 for mercury to 850 for chromium (Table 2-7). Mean  $K_d$  values indicate that chromium, beryllium, and zinc

are more likely to sorb to sediments, while cadmium, mercury, and silver are more likely to partition into water and become bioavailable.

COPCs are expected to be well-mixed within Lake Calumet. Water solubility is the maximum amount of a chemical that will dissolve in pure water at a specific temperature and pH. A chemical's solubility in water affects its fate and transport in all environmental media. Highly soluble compounds tend to leach rapidly from soil/sediment into ground and surface water supplies. In addition, they tend to be more volatile (Menzer and Nelson, 1980), more biodegradable (Lyman *et al.*, 1982), and more mobile (Briggs, 1981) than less soluble or insoluble chemicals. Of the chemicals listed in Table 2-6, diethyl phthalate, 1,2-trans-dichloroethylene, methylene chloride, phenol, and toluene are most soluble in water (solubilities range from 535 to 20,000 mg/L), while benzo(ghi)perylene and indeno(1,2,3-cd)pyrene are less soluble in water (solubilities are  $7 \times 10^{-4}$  to  $5 \times 10^{-4}$  mg/L).

Vapor pressure and Henry's Law Constant are two indicators of a chemical's volatility. Vapor pressure measures the relative volatility of a chemical in its pure state and is useful for determining the extent to which a chemical will be transported into air from soil and water surfaces. Volatilization is a major route for the distribution of many chemicals in the environment (Dobbs and Cull, 1982). A chemical's volatility is affected by its solubility, vapor pressure, and molecular weight, as well as the nature of the air-to-water or soil-to-water interface through which the chemical must pass (Lyman *et al.*, 1982). Chemicals with a low vapor pressure and a high affinity for soil or water are less likely to vaporize than chemicals that have a high vapor pressure and a weak affinity for soil or water. Methylene chloride, 1,2-trans-dichloroethylene, phenol, and toluene which have high vapor pressures relative to the other COPCs, are expected to volatilize rapidly. Henry's Law Constant, which combines information on vapor pressure, molecular weight, and solubility, represents a better measure of estimating releases from water. Generally, chemicals with a Henry's Law Constant between  $10^{-5}$  and  $10^{-7}$ , which includes all of the phthalates and most PAHs, are considered to have a low potential to volatilize from water. Conversely, chemicals with a Henry's Law Constant greater than  $10^{-3}$ ,

such as 1,2-trans-dichloroethylene, methylene chloride, and toluene, are likely to volatilize rapidly from water.

$K_{oc}$  values represent the sediment-water partition coefficient normalized for total organic carbon (TOC).  $K_{oc}$  values range from approximately 8.8 to  $5.5 \times 10^6$  for the COPCs (Table 2-6). Compounds with low  $K_{oc}$  values are generally more mobile, soluble, and subject to degradation, while those with high  $K_{oc}$  values are less soluble but more persistent.  $K_{oc}$  values are important to the analysis because they are used to estimate the equilibrium partition of COPCs between sediment and pore water. Benzo(a)anthracene, benzo(a)pyrene, benzo(ghi)perylene, and indeno(1,2,3-cd)pyrene have high  $K_{oc}$  values, which indicate that they are likely to sorb strongly to sediments.

Table 2-6 also lists log octanol/water partition coefficient ( $K_{ow}$ ) for the organic COPCs.  $K_{ow}$  has been recognized as a key parameter in predicting the environmental fate of organic compounds, and has been shown to be linearly correlated with bioconcentration of organic compounds in aquatic organisms. The octanol-water partition coefficient is defined as the ratio of a chemical's concentration in the octanol phase to its concentration in the aqueous phase (Lyman *et al.*, 1982). Generally, higher  $K_{ow}$  values are indicative of a high bioconcentration potential. Chemicals with large  $K_{ow}$  values tend to accumulate in soil, sediment, and biota but not in water. For example, lipophilic compounds, such as benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(ghi)perylene, and indeno(1,2,3-cd)pyrene are more soluble in organic matter and more likely to bioaccumulate in living organisms.

**TABLE 2-1**  
**SUMMARY OF METAL AND ORGANIC CONSTITUENTS IN CLAY<sup>a</sup>**

<b>Chemical</b>	<b>Sample Size</b>	<b>Range (<math>\mu\text{g/kg}</math>)</b>	<b>Arithmetic Mean (<math>\mu\text{g/kg}</math>)<sup>b</sup></b>	<b>Standard Deviation (<math>\mu\text{g/kg}</math>)<sup>b</sup></b>	<b>95 Percent Upper Confidence Limit (<math>\mu\text{g/kg}</math>)<sup>b</sup></b>
<b>METALS</b>					
Antimony	23	ND (96%) - 3850	3550	157	3606
Arsenic	23	2900 - 18,000	10,430	3674	11,741
Beryllium	23	350 - 870	616	136	664
Cadmium	23	1400 - 7100	2644	1238	3085
Chromium	23	7700 - 23,000	14,791	3998	16,219
Copper	23	21,000 - 50,000	34,522	8675	37,619
Lead	23	10,000 - 49,000	20,391	7976	23,239
Mercury	23	ND (52%) - 100	49.5	11.2	53.5
Nickel	23	23,000 - 41,000	31,696	4704	33,375
Silver	23	ND (35%) - 650	591	28.8	602
Zinc	23	45,000 - 100,000	62,130	14,586	67,337

**TABLE 2-1**  
**SUMMARY OF METAL AND ORGANIC CONSTITUENTS IN CLAY<sup>a</sup>**  
**- Continued -**

Chemical	Sample Size	Range (µg/kg)	Arithmetic Mean (µg/kg) <sup>b</sup>	Standard Deviation (µg/kg) <sup>b</sup>	95 Percent Upper Confidence Limit (µg/kg) <sup>b</sup>
<b>ORGANICS<sup>c</sup></b>					
Benzene	23	ND (91% - 24.4)	3.5	4.6	5.2
Bis(2-ethylhexyl)phthalate	23	337 - 41,500	6143	8490	10,544
Di-n-butyl phthalate	23	1900 - 17,600	5812	3941	7677
Phenanthrene	23	ND (61%) - 429	313	51	331
Toluene	23	ND (87%) - 33.3	5.1	6.2	7.3

<sup>a</sup> Only Phase II clay data were used, since Phase I data were shown to be invalid.

<sup>b</sup> Non-detect values were assumed to be equal to one-half the sample quantitation limit.

<sup>c</sup> All other organics detected in sediments were not detected in at least five percent of the clay samples analyzed.

**TABLE 2-2**  
**THE MEAN CONCENTRATION, STANDARD DEVIATION, AND RESULTS OF THE ONE-TAILED T-TEST**  
**COMPARING "LAKE CALUMET" AND "NEAR-PIER" SEDIMENT SAMPLES**

Chemical	Arithmetic Mean Lake Calumet Sediment Concentration <sup>a</sup> (µg/kg)	Standard Deviation Lake Calumet Sediments (µg/kg)	Arithmetic Mean Near-Pier Sediment Concentration <sup>b</sup> (µg/kg)	Standard Deviation Near-Pier Sediments (µg/kg)	Calculated t Value	P Value <sup>c</sup>
<b>METALS</b>						
Antimony	12,636	8358	5296	6225	2.981	0.0026 <sup>d</sup>
Arsenic	24,818	5437	17,148	7179	3.181	0.0015 <sup>d</sup>
Beryllium	385	133	818	354	3.917	0.0002 <sup>e</sup>
Cadmium	1099	1391	2789	1540	3.150	0.0016 <sup>e</sup>
Chromium	17,800	11,964	45,119	41,515	2.131	0.02 <sup>e</sup>
Copper	32,728	19,390	43,444	17,046	1.690	0.05 <sup>e</sup>
Lead	56,728	37,253	110,519	73,250	2.304	0.014 <sup>e</sup>
Mercury	82.7	62.1	150	104	1.994	0.027 <sup>e</sup>
Nickel	21,409	11,702	24,963	11,366	0.877	0.196 <sup>e</sup>
Silver	600	332	1000	876	1.463	0.076 <sup>f</sup>
Zinc	193,273	99,513	288,889	278,860	1.101	0.139 <sup>f</sup>
<b>ORGANICS</b>						
Acenaphthene	147	59.5	120	41.6	1.573	0.063 <sup>f</sup>
Anthracene	187	104	246	420	0.455	0.33 <sup>f</sup>
Benzene	3.2	1.9	2.1	0.4	2.862	0.0035 <sup>d</sup>
Benzo(a)anthracene	501	135	984	1309	1.206	0.12 <sup>f</sup>
Benzo(a)pyrene	262	201	584	1048	1.004	0.16 <sup>f</sup>
Benzo(b)fluoranthene	340	90	974	1931	1.079	0.144 <sup>f</sup>
Benzo(k)fluoranthene	198	119	353	706	0.718	0.24 <sup>f</sup>
Benzo(ghi)perylene	342	189	398	792	0.305	0.38 <sup>f</sup>
Bis(2-ethylhexyl)phthalate	1407	2275	2821	4302	1.023	0.16 <sup>f</sup>
Chrysene	542	302	784	1530	0.516	0.31 <sup>f</sup>

**TABLE 2-2**  
**THE MEAN CONCENTRATION, STANDARD DEVIATION,**  
**AND RESULTS OF THE ONE-TAILED T-TEST COMPARING LAKE CALUMET AND NEAR-PIER SEDIMENT SAMPLES**  
**- Continued -**

Chemical	Arithmetic Mean Lake Calumet Sediment Concentration <sup>a</sup> (μg/kg)	Standard Deviation Lake Calumet Sediments (μg/kg)	Arithmetic Mean Near-Pier Sediment Concentration <sup>b</sup> (μg/kg)	Standard Deviation Near-Pier Sediments (μg/kg)	Calculated t Value	P Value <sup>c</sup>
1,2-trans-Dichloroethylene	1.6	1.0	1.6	2.2	0.111	0.46 <sup>f</sup>
Di-n-butyl phthalate	375	217	2405	4087	1.633	0.06 <sup>f</sup>
Diethyl phthalate	437	192	565	101	2.652	0.006 <sup>a</sup>
Heptachlor	8.9	15.2	6.0	17.4	0.450	0.33 <sup>f</sup>
Indeno(123-cd)pyrene	218	10.0	378	817	0.646	0.26 <sup>f</sup>
Fluoranthene	812	2.1	1382	4.2	1.158	0.13 <sup>f</sup>
Fluorene	168	69.5	143	128	0.604	0.28 <sup>f</sup>
Methylene chloride	60.2	124	39.0	102	0.544	0.30 <sup>f</sup>
Naphthalene	142	58.0	184	382	0.356	0.36 <sup>f</sup>
Phenanthrene	682	356	2025	2363	1.861	0.04 <sup>a</sup>
Phenol	675	420	177	288	4.144	0.0001 <sup>d</sup>
Pyrene	663	1.9	1400	3.9	1.727	0.047 <sup>a</sup>
Toluene	3.0	0.03	2.7	0.7	1.309	0.10 <sup>f</sup>

<sup>a</sup> Mean of all 11 "Lake Calumet" sediment samples collected during Phase I investigations (Phase 1 samples S-1 through S-6 [S-6 not sampled due to insufficient sample volume] and S-17 through S-22). Non-detect values were assumed to equal one-half the sample quantitation limit.

<sup>b</sup> Mean of sediment samples collected near the CWMCS property (i.e., near-pier samples only). Non-detect values were assumed to equal one-half the sample quantitation limit. Sample size = 27 for all metals and 26 for benzene, 1,2-trans-dichloroethylene, diethyl phthalate, methylene chloride, and toluene. Sample size equals 25 for acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(ghi)perylene, bis(2-ethylhexyl)phthalate, di-n-butyl phthalate, fluoranthene, fluorene, indeno(123-cd)pyrene, naphthalene, phenanthrene, phenol, and pyrene. Sample size is 17 for heptachlor.

<sup>c</sup> Test was considered significant at the 95% level of confidence using a one-tailed Student t test.

<sup>d</sup> Mean "Lake Calumet" sediment concentration is significantly greater than the mean near-pier sediment concentration.

<sup>e</sup> Mean near-pier concentration is significantly greater than the mean Lake Calumet sediment concentration.

<sup>f</sup> There is no significant difference between mean Lake Calumet and mean near-pier sediment concentrations.



**TABLE 2-3**  
**KOLMOGOROV-SMIRNOV GOODNESS OF FIT TEST RESULTS AND MEAN, STANDARD DEVIATION,**  
**AND UPPER-BOUND CONCENTRATIONS FOR METALS AND ORGANIC CHEMICALS OF POTENTIAL**  
**CONCERN IN SEDIMENTS NEAR THE CWMCS FACILITY**

Chemical	Sample Size <sup>a</sup>	Distribution <sup>f</sup>	Significance Level <sup>b</sup>	Mean (μg/kg) <sup>c</sup>	Standard Deviation (μg/kg) <sup>d</sup>	H or t Statistic <sup>e</sup>	95% Upper Confidence Limit for the Distribution (μg/kg)	Maximum Measured Value of Near-Pier Samples (μg/kg)
<b>METALS</b>								
Antimony	28	none (assumed normal)	---	7148	5617	1.703	8956	30,000
Arsenic	28	lognormal	0.221	16,614	1.8	2.01	24,564	87,000
Beryllium	28	lognormal	0.683	734	1.6	1.91	965	1600
Cadmium	28	normal	0.628	2907	1561	1.703	3409	6600
Chromium	28	lognormal	0.313	33,124	2.1	2.15	57,893	198,000
Copper	28	lognormal	0.138	39,301	1.6	1.90	50,857	74,000
Lead	28	lognormal	0.330	91,035	1.8	2.03	138,092	400,000
Mercury	28	none (assumed lognormal)	---	118	2.1	2.17	210	340
Nickel	28	lognormal	0.162	21,960	1.7	1.96	30,448	43,000
Silver	28	none (assumed lognormal)	---	1088	1.7	1.98	1442	3100
Zinc	28	normal	0.303	236,786	118,286	1.703	274,855	499,000
<b>ORGANICS</b>								
Acenaphthene	28	none (assumed lognormal)	---	839	2.7	2.44	2148	2550
Anthracene	28	normal	0.073	1203	723	1.703	1436	2550
Benzene	28	none (assumed lognormal)	---	2.9	1.6	1.94	3.85	13

**TABLE 2-3**  
**RESULTS OF THE KOLMOGOROV-SMIRNOV GOODNESS OF FIT TESTS AND THE MEAN, STANDARD DEVIATION, AND**  
**UPPER-BOUND CONCENTRATIONS FOR METALS AND ORGANIC CHEMICALS OF POTENTIAL CONCERN IN**  
**SEDIMENTS NEAR THE CWMCS FACILITY**  
 - Continued -

Chemical	Sample Size <sup>a</sup>	Distribution <sup>f</sup>	Significance Level <sup>b</sup>	Mean (μg/kg) <sup>c</sup>	Standard Deviation (μg/kg) <sup>d</sup>	H or t Statistic <sup>e</sup>	95% Upper Confidence Limit for the Distribution (μg/kg)	Maximum Measured Value of Near-Pier Samples (μg/kg)
Benzo(a)anthracene	28	none (assumed lognormal)	---	3419	2.7	2.45	8802	10,500
Benzo(a)pyrene	28	normal	0.049	1765	1042	1.703	2100	4740
Benzo(b)fluoranthene	28	normal	0.107	3200	2274	1.703	3932	9290
Benzo(k)fluoranthene	28	normal	0.258	1666	1011	1.703	1992	3600
Benzo(ghi)perylene	28	none (assumed lognormal)	---	1760	2.8	2.50	4863	5500
Bis(2-ethylhexyl)phthalate	28	normal	0.113	6287	3832	1.703	7520	13,500
Chrysene	28	none (assumed lognormal)	---	1547	2.1	2.15	2718	7160
1,2-trans-Dichloroethylene	28	none (assumed normal)	---	1.7	2.2	1.703	2.4	12
Diethyl phthalate	28	normal	0.047	6150	3954	1.703	7423	13,500
Di-n-butyl phthalate	28	normal	0.094	6539	4535	1.703	7999	17,900
Fluoranthene	28	lognormal	0.088	2184	2.0	2.12	3681	16,100
Fluorene	28	normal	0.050	1192	735	1.703	1428	2550
Heptachlor	18 <sup>g</sup>	normal	0.156	38.7	25.9	1.74	49.4	75
Indeno(1,2,3-cd)pyrene	28	normal	0.078	2664	1886	1.703	3271	6500
Methylene chloride	28	none (assumed lognormal)	---	10.6	5.4	3.44	137	493
Naphthalene	28	normal	0.083	1054	642	1.703	1261	2150

**TABLE 2-3**  
**RESULTS OF THE KOLMOGOROV-SMIRNOV GOODNESS OF FIT TESTS AND THE MEAN, STANDARD DEVIATION, AND**  
**UPPER-BOUND CONCENTRATIONS FOR METALS AND ORGANIC CHEMICALS OF POTENTIAL CONCERN IN**  
**SEDIMENTS NEAR THE CWMCS FACILITY**  
 - Continued -

Chemical	Sample Size <sup>a</sup>	Distribution <sup>f</sup>	Significance Level <sup>b</sup>	Mean (μg/kg) <sup>c</sup>	Standard Deviation (μg/kg) <sup>d</sup>	H or t Statistic <sup>e</sup>	95% Upper Confidence Limit for the Distribution (μg/kg)	Maximum Measured Value of Near-Pier Samples (μg/kg)
Phenanthrene	28	normal	0.067	3734	2378	1.703	4499	10,100
Phenol	28	normal	0.051	1007	531	1.703	1178	2000
Pyrene	28	none (assumed normal)	---	2538	2558	1.703	3361	12,400
Toluene	28	none (assumed normal)	---	3.9	2.4	1.703	4.7	15

- <sup>a</sup> Sediment samples collected near the pier only. Sample size equals 28 for metals and organics.
- <sup>b</sup> The data were assumed to fit the distribution if the results of the K-S test are significant at the 95 % level of confidence.
- <sup>c</sup> Arithmetic means are reported for chemicals shown to be normally distributed, while the arithmetic mean of the log-transformed data is reported for chemicals shown to be lognormally distributed.
- <sup>d</sup> Arithmetic standard deviations are reported for chemicals shown to be normally distributed, while the arithmetic standard deviation of the log-transformed data is reported for chemicals shown to be lognormally distributed.
- <sup>e</sup> The H statistic and Equation 3-2 were used to calculate upper confidence limits (UCLs) for chemicals with a lognormal distribution, lognormal) that yielded the higher UCL value.
- <sup>f</sup> Chemicals whose data did not fit any distribution (i.e., those labeled "none" in column three) were assumed to fit the distribution (normal or lognormal) that yielded the higher UCL value.
- <sup>g</sup> Sample size equals 18. Phase II samples were not analyzed for heptachlor.

**TABLE 2-4**  
**THE MEAN CONCENTRATION, STANDARD DEVIATION, AND RESULTS OF THE ONE-TAILED t-TESTS**  
**COMPARING CLAY AND SEDIMENT SAMPLES COLLECTED NEAR THE CWMCS FACILITY**

Chemical	Distribution of the Near-Pier Sediment Data <sup>a</sup>	Mean Clay Concentration (µg/kg) <sup>b</sup>	Standard Deviation Clay (µg/kg)	Mean Sediment Concentration (µg/kg) <sup>c</sup>	Standard Deviation Sediments (µg/kg) <sup>d</sup>	Calculated t Value	P Value <sup>e</sup>	Is This Chemical a COPC?
<b>METALS</b>								
Arsenic	lognormal	10,430	3674	15,537	1.6	3.653	0.0003	Yes <sup>f</sup>
Beryllium	normal	616	136	818	354	2.584	0.006	Yes
Cadmium	normal	2644	1238	2789	1540	0.364	0.36	No <sup>g</sup>
Chromium	lognormal	14,791	3998	34,303	2.1	5.503	<0.0001	Yes
Copper	lognormal	34,522	8675	39,815	1.6	1.648	0.053	No <sup>g</sup>
Lead	lognormal	20,391	7976	92,596	1.8	10.99	<0.0001	Yes
Mercury	none (assumed lognormal)	49.5	11.2	107	2.4	4.337	<0.0001	Yes
Nickel	lognormal	31,696	4704	22,181	1.7	3.059	0.002	No <sup>h</sup>
Silver	none (assumed lognormal)	591	1.1	751	2.0	1.635	0.054	No <sup>g</sup>
Zinc	none (assumed lognormal)	62,130	14,586	220,136	2.1	8.053	<0.0001	Yes
<b>ORGANICS</b>								
Benzene	none (assumed lognormal)	3.5	4.6	2.1	1.25	2.780	0.004	No <sup>h</sup>
Bis(2-ethylhexyl)phthalate	none (assumed lognormal)	6143	8490	1184	3.3	2.428	0.01	No <sup>h</sup>
Di-n-butyl phthalate	none (assumed normal)	5812	3941	2405	4087	2.935	0.003	No <sup>h</sup>
Phenanthrene	none (assumed lognormal)	313	47	1066	3.3	4.953	<0.0001	Yes
Toluene	none (assumed lognormal)	5.1	6.2	2.6	1.5	3.728	0.0003	No <sup>h</sup>

- <sup>a</sup> Chemicals whose data did not fit any distribution (i.e., those labeled "none") were assumed to fit the distribution (i.e., normal or lognormal) that yielded the higher upper-bound (95% upper confidence limit value). If the data were shown to be lognormally distributed, the t-test for that chemical was done on the log transformed data. If the data were shown to be normally distributed, the t-test for that chemical was done on the untransformed data.
- <sup>b</sup> Mean of all 23 clay samples collected during Phase II investigations. Non-detect values were assumed to equal one-half the sample quantitation limit.
- <sup>c</sup> Mean of sediment samples collected near the CWMCS property (i.e., near-pier samples only). Non-detect values were assumed to equal one-half the sample quantitation limit. Sample size = 27 for all metals and 26 for benzene and toluene. Sample size equals 25 for bis(2-ethylhexyl)phthalate, di-n-butyl phthalate, and phenanthrene. Arithmetic means are reported for chemicals shown to be normally distributed, while the arithmetic mean of the log-transformed data is reported for chemicals shown to be lognormally distributed; arithmetic means are reported for chemicals shown to be normally distributed, while the arithmetic mean of the log-transformed data is reported for chemicals shown to be lognormally distributed.
- <sup>d</sup> Arithmetic standard deviations are reported for chemicals shown to be normally distributed, while the arithmetic standard deviation of the log-transformed data is reported for chemicals shown to be lognormally distributed.
- <sup>e</sup> Test was considered significant at the 95% level of confidence using a one-tailed Student t test.
- <sup>f</sup> Mean sediment concentration is significantly greater than the mean clay concentration; hence, that chemical is a COPC.
- <sup>g</sup> There is no significant difference between the mean sediment concentration and the mean clay concentration; hence that chemical is not a COPC.
- <sup>h</sup> Mean clay concentration is significantly greater than the mean sediment concentration; hence, that chemical is not considered a COPC.

Some contaminants were detected in sediment samples but are not included in this table. These contaminants were excluded from this table because they were not detected above current detection limits in more than five percent of the clay samples analyzed. These chemicals were considered COPCs.

**TABLE 2-5**  
**SUMMARY OF CHEMICALS OF POTENTIAL CONCERN BY MEDIUM**

Chemical	Surface Water	Sediments
<b>METALS</b>		
Antimony		X
Arsenic		X
Beryllium		X
Chromium		X
Lead		X
Mercury		X
Zinc		X
<b>ORGANICS</b>		
Acenaphthene		X
Anthracene		X
Benzo(a)anthracene		X
Benzo(a)pyrene		X
Benzo(b)fluoranthene		X
Benzo(k)fluoranthene		X
Benzo(ghi)perylene		X
Chrysene		X
1,2-trans-Dichloroethylene		X
Diethyl phthalate		X
Fluoranthene		X
Fluorene		X
Heptachlor		X
Indeno(1,2,3-cd)pyrene		X
Methylene chloride		X
Naphthalene		X
Phenanthrene		X
Phenol		
Pyrene		X
Toluene	X	

**TABLE 2-6**  
**ENVIRONMENTAL FATE PROPERTIES FOR ORGANIC CONTAMINANTS OF POTENTIAL CONCERN**  
**IN SURFACE WATER AND SEDIMENTS NEAR THE CWMCS FACILITY**

Compound	CAS Number	Vapor Pressure (mm Hg)	Henry's Law Constant	Log $K_{ow}$	$K_{oc}$	Solubility (mg/L)
Acenaphthene	83-32-9	$1.6 \times 10^{-3}$	$7.6 \times 10^{-5}$	4.04	4600	4.14
Anthracene	120-12-7	$2.0 \times 10^{-4}$	$7.8 \times 10^{-5}$	4.45	14,000	$4.5 \times 10^{-2}$
Benz(a)anthracene	56-55-3	$2.2 \times 10^{-8}$	$9.8 \times 10^{-7}$	5.60	$1.38 \times 10^6$	$5.7 \times 10^{-3}$
Benzo(a)pyrene	50-32-8	$5.6 \times 10^{-9}$	$1.1 \times 10^{-4}$	6.06	$5.5 \times 10^6$	$1.2 \times 10^{-3}$
Benzo(b)fluoranthene	205-99-2	$5.0 \times 10^{-7}$	$3.7 \times 10^{-6}$	6.06	$5.5 \times 10^5$	$1.4 \times 10^{-2}$
Benzo(k)fluoranthene	207-08-9	$5.1 \times 10^{-7}$	$8.3 \times 10^{-5}$	6.06	$5.5 \times 10^5$	$4.3 \times 10^{-3}$
Benzo(ghi)perylene	191-24-2	$1 \times 10^{-10}$	$1.6 \times 10^{-6}$	6.51	$1.6 \times 10^6$	$7.0 \times 10^{-4}$
Chrysene	218-01-9	$6.3 \times 10^{-9}$	$1.1 \times 10^{-7}$	5.61	$2.0 \times 10^5$	$1.8 \times 10^{-3}$
1,2,-trans-Dichloroethylene	540-59-0	324	$6.6 \times 10^{-3}$	0.48	59	6330
Diethyl phthalate	84-66-2	$3.5 \times 10^{-3}$	$1.1 \times 10^{-6}$	2.50	142	896
Fluoranthene	206-44-0	$5.0 \times 10^{-6}$	$1.1 \times 10^{-5}$	4.90	$3.8 \times 10^4$	0.26
Fluorene	86-73-7	$7.1 \times 10^{-4}$	$5.9 \times 10^{-5}$	4.20	7300	1.7
Heptachlor	76-44-8	$3.0 \times 10^{-4}$	$8.2 \times 10^{-4}$	4.40	$1.2 \times 10^5$	$1.8 \times 10^{-2}$
Indeno(1,2,3-cd)pyrene	193-39-5	$1.0 \times 10^{-10}$	$1.6 \times 10^{-6}$	6.50	$1.6 \times 10^6$	$5.3 \times 10^{-4}$
Methylene chloride	75-09-2	362	$2.0 \times 10^{-3}$	1.3	8.8	$2.0 \times 10^4$
Naphthalene	91-20-3	0.087	$4.6 \times 10^{-4}$	3.38	940	32
Phenanthrene	850-10-8	$6.8 \times 10^{-4}$	$6.8 \times 10^{-4}$	4.46	14,000	1.0
Phenol	108-95-2	0.34	$4.5 \times 10^{-7}$	1.46	14.2	$9.3 \times 10^4$
Pyrene	190-00-0	$2.5 \times 10^{-6}$	$1.3 \times 10^{-6}$	4.88	38,000	0.13
Toluene	108-88-3	28	$6.6 \times 10^{-3}$	2.71	300	535

Source: USEPA (1986a)

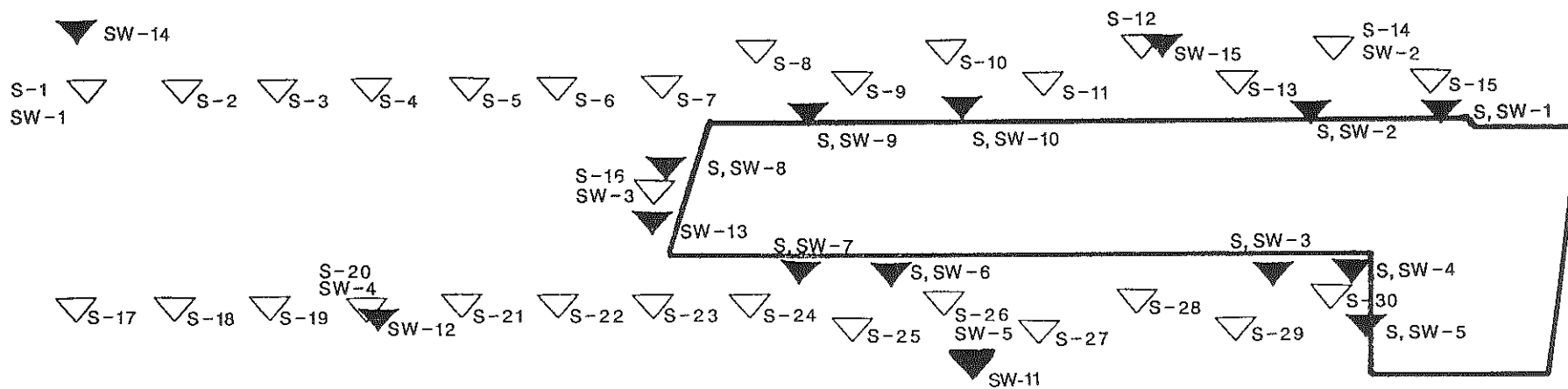
**TABLE 2-7**  
**K<sub>d</sub> VALUES FOR THE METALS OF POTENTIAL CONCERN**  
**IN SURFACE WATER AND SEDIMENT**

<b>Metal</b>	<b>Observed Range in K<sub>d</sub> Values (L/kg)<sup>a</sup></b>	<b>Expected K<sub>d</sub> (L/kg)<sup>a</sup></b>
Antimony	NA <sup>b</sup>	45
Arsenic	1.0 - 8.3	200
Beryllium	NA	650
Chromium	470 - 150,000	850
Lead	4.5 - 7640	400
Mercury	NA	10
Zinc	0.1 - 8000	38



<sup>a</sup> Source: Baes *et al.*, 1984

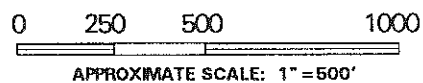
<sup>b</sup> A range of values was not reported for that metal.





# LEGEND

- S-14, SW-2  PHASE I SEDIMENT SAMPLE (S) SURFACE WATER SAMPLE (SW)
- S, SW-1  PHASE II SEDIMENT SAMPLE (S) SURFACE WATER SAMPLE (SW)



CWM CHEMICAL SERVICES INC.  
CHICAGO INCINERATOR  
RFI PHASE I AND PHASE II

**FIGURE 2-1**  
**Surface Water and Sediment Sample Locations**

DRN. BY: MG	PROJ. NO.: 13963-052-29
DATE: JUNE 1992	DAMES & MOORE

### **3.0 EXPOSURE ASSESSMENT**

An important step in the risk assessment process is to determine if exposure to facility-related contaminants may increase the incidence of adverse effects in ecological receptors. Accomplishing this task involves:

- Selecting key ecological receptors;
- Identifying potential pathways of exposure;
- Estimating exposure-point concentrations;
- Estimating dose by key ecological receptors;

The principal focus of the exposure assessment is on aquatic receptors potentially inhabiting Lake Calumet near the CWMCS pier, since there is insufficient terrestrial habitat on-site to support a viable terrestrial ecosystem, and the area surrounding the CWMCS facility is almost exclusively heavy industrial, which does not offer suitable habitat for a diverse terrestrial community (see Section 3.1.1).

#### **3.1 Selection of Key Ecological Receptors**

Ecological or environmental receptors are those organisms that may potentially be exposed to COPCs from the facility now or in the future. Since energy and matter flow through an ecosystem in food webs, key species are those that are representative of the facility food web. Among all the species comprising a food web, those that occupy niches that are key to overall ecosystem function are of greatest interest for ecological risk assessment (*e.g.*, principal prey species or species that are fundamental food items for principal prey species). In general, loss of a few individuals of a species is unlikely to significantly diminish the viability of the population or disrupt the community or ecosystem of which it is a part. As a result, the fundamental unit for ecological risk assessment is generally the population rather than the

individual (with the exception of T&E species) (Barnthouse and Suter, 1986).

### 3.1.1 Terrestrial Receptors

As described in Section 1.3.3, exposures to terrestrial animals are expected to be minimal, and hence, will not be quantified. Water fowl and shorebirds, which are known to occur in the area, tend to feed largely on aquatic organisms taken from throughout Lake Calumet (not just the area near the CWMCS facility) as well as other water bodies in the area. Although it is possible that waterfowl and shorebirds may search for food in areas of Lake Calumet near the CWMCS facility, dose to these receptors from exposure to facility-related contaminants is expected to be minimal because: (1) fish consumed from Lake Calumet near the CWMCS facility are likely to represent only a small fraction of their total dietary intake, (2) surface water around the CWMCS facility is relatively uncontaminated (see Section 2.0), and (3) most of the birds are not expected to overwinter in the area. Furthermore, potential exposures by non-aquatic bird species were not modeled since: (1) the area immediately surrounding the facility is largely open land that provides minimal habitat and cover for non-aquatic bird species; (2) much of the open land around the facility consists primarily of other waste management facilities (i.e., landfills) with little vegetative cover; and (3) the home ranges of these species are large relative to the area occupied by the facility.

As noted, the facility has been used by gulls, primarily herring gulls, for nesting and fledging their young. The isolation afforded by the fence and surrounding water provides a hospitable area for the breeding gulls. The observed mortality of gulls is not thought to be attributable to facility-related contaminants for the following reasons: (1) surface water around the pier that the gulls might ingest is relatively uncontaminated, (2) gulls do not consume large quantities of soils while feeding; (3) contaminants are not likely to be absorbed through the skin; (4) birds have successfully fledged their young; and (5) dead gulls have been observed in other sections of the Lake Calumet area. Possible explanations of the gull deaths include: (1) lack of sufficient food to support the existing population since the closure of the Paxton II Landfill across the street from the CWMCS facility, and (2) disturbance aggression. Robert and Ralph

(1975) found that disturbance (e.g., humans routinely walking through the area) during pre-fledging can cause massive mortality in young birds. As the young gulls flee an intruder they may leave their own territory and be subjected to aggression by other adults and young. Although natural annual mortality in adult birds is expected to be less than 10%, when applying the mortality rate and resident time to the number of birds in the nesting area, some dead gulls would be expected to be observed. Gulls normally fledge two young out of a three-clutch brood if environmental conditions are favorable (i.e., mortality rate is 33%; personal communication with Dr. Linwood Smith, avian biologist, Dames & Moore, January 1994). Disturbances, natural or man-made, can reduce survival of young to zero (Robert and Ralph, 1975).

Habitat for a majority of the indigenous small mammal species is limited or non-existent, and large mammals are not likely to frequent the facility. The CWMCS facility is constructed on a man-made pier that has become vegetated with invader-type plant species typical of an early successional community. As such, habitat for a majority of the indigenous small mammal species is limited or non-existent. The chain link security fence essentially isolates approximately one-half of the pier and encloses the remainder of the pier from large mammal encroachment. In summary, limited exposures by birds and other terrestrial animals to facility-related contaminants is not expected to cause adverse, population-level effects. Hence, exposures by these species are not quantitatively evaluated.

### **3.1.2 Threatened and Endangered Species**

Potential impacts to species protected under the Endangered Species Act must be evaluated if these species occur within the facility, or there is reasonable potential for these species to occur on or use some portion of the facility (i.e., suitable habitat exists and/or known occurrence in the area). ERAs typically focus on assessing individual (versus population or ecosystem) level impacts for T&E species that could occur on the facility, could be directly affected by the potential migration of facility-related contaminants, or whose habitat could potentially be impacted by facility-related contaminants.

Plant and animal species considered by the Illinois Department of Conservation (letter from Deanna Glosser, Endangered Species Protection Manager, October 6, 1993) listed as threatened or endangered in the Illinois National Heritage Database and their status are listed in Table 3-1. Of the 13 Illinois state-listed T&E bird species that could potentially occur in the Lake Calumet area, five (yellow rail, black-crowned night heron, American bittern, red-shouldered hawk, and northern harrier) have been observed in the Lake Calumet area. The T&E plant species are primarily associated with established wetland areas, which includes Lake Calumet. These species are not expected to occur on the CWMCS facility, however, since the pier that extends into Lake Calumet consists primarily of artificial fill material (versus native soil) and is inhabited by invader and early successional species. T&E bird species, which are primarily wetland inhabiting species, could potentially frequent the facility, since the pier is surrounded by Lake Calumet on three sides. These T&E birds are wetland-dependent and have been listed based on their reducing numbers in response to diminishing wetland habitats within Illinois.

While some T&E bird species may land on, use, and feed on or from the facility, they are not likely to nest or substantial amounts of time on facility property or to be exposed to significant amounts of facility-related contaminants for the following reasons:

- They do not winter in the area.
- Their home range is large relative to the affected area.
- Most of the T&E birds species are associated with wetland areas, and no wetlands exist on facility property. The CWMCS facility consists of an artificial pier inhabited primarily by invader and early successional species. For example, although the black-crowned night heron does nest in the area, no wetlands where herons typically nest exist on the facility property.
- Releases from the facility, which have been primarily limited to small releases of facility-related contaminants into Lake Calumet, are not expected to contaminate wetland areas that exist in terrestrial areas north of the facility (i.e., away from Lake Calumet).

Given that suitable wetland areas occur near the facility that are not expected to be contaminated by facility releases, it is not reasonable to conclude that the T&E species listed in Table 3-1 would spend substantial amounts of time in areas affected by facility releases.

No federally-listed T&E species are known to occur within five miles of the facility. Five candidate avian species (the yellow rail, the black-crowned night heron, the American bittern, the red-shouldered hawk, and the northern harrier) have been observed within a five-mile radius of the facility, however. Some candidate species (the black tern, the common tern, and the black-crowned night heron) have been known to use and nest in wetlands within this five-mile radius. The nearest wetland that could be used by these species is located approximately 0.5 miles southeast of the facility. Although T&E bird species are not expected to be exposed to substantial amounts of facility-related contaminants for the reasons noted above, certain wetland species could potentially nest in wetlands located near the facility.

### **3.2 Aquatic Receptors**

Following the strategy outlined above, the focus of this ERA is on potential impacts to aquatic receptors inhabiting Lake Calumet. Facility-specific aquatic receptors of concern were selected from the variety of species known or suspected to inhabit Lake Calumet according to the following criteria:

- **Species that are vital to the structure and function of the food web (i.e., principal prey species or species that are major food items for principal prey species).** Substantial impacts on species that occupy critical positions in the food web structure may ramify throughout the ecosystem, potentially resulting in disruption of higher trophic level populations that depend upon the affected population for survival and/or stability.
- **Species that exhibit a marked toxicological sensitivity to the COPCs.** Ecosystem function can be impaired if certain component species are particularly vulnerable to chemical exposure. Selection of key receptors is thus designed to

ensure that the most sensitive organisms actually present in Lake Calumet near the CWMCS facility are evaluated.

- **Species that have unique life histories and/or feeding habits.** Significant impacts on such species might eliminate unique ecological niches, with unpredictable results on the ecosystem as a whole.
- **Species for which toxicological data are readily available in the scientific literature.** While such species may not be "key" in the sense of occupying a critical ecological niche, the availability of data on their responses to COPCs reduces uncertainty in the evaluation as a whole.
- **Species that are ubiquitous across habitats.** Species that are ubiquitous across habitats are likely to be more exposed than species who occupy a smaller niche.

Selection of key receptor species was designed to minimize the possibility that other species could be more exposed than the key species themselves and to include representation of sensitive organisms. Using these criteria, the following key species representing several different phyletic groups were identified:

- Ictalurids (e.g., bullhead, catfish)
- Centrarchids (e.g., smallmouth bass, sunfish, bluegill)
- Salmonids (e.g., salmon and trout)
- Cyprinids (e.g., minnows, goldfish)
- Water column invertebrates (e.g., *Daphnia* sp., amphipods, copepods)
- Benthic invertebrates (e.g., midges, worms, crayfish).

Although each key species selected may not necessarily meet all of the criteria defined above, selection of key species collectively was intended to meet all criteria. Specific reasons for selecting each of these key species are discussed in Table 3-2. For example both pelagic (individuals that inhabit the water column) and benthic (individuals that live near or on the bottom) were included as were vertebrate and invertebrate species. Benthic species (ictalurids and benthic invertebrates) were included since they have direct contact with bottom sediments and/or they feed primarily on organisms that live in bottom sediments. Cyprinids (minnows)

were included since they are a key prey species for larger, piscivorous fish.

### **3.3 Identification of Potential Exposure Pathways**

Components of a complete exposure pathway include a source, a mechanism of contaminant release, retention and transport media, a point of potential biota contact, and an exposure route at the contact point. Exposure pathways relevant to the aquatic receptors present in Lake Calumet adjacent to the CWMCS facility consist of two components: surface water and sediments. Within surface water, contaminants are expected to be fairly well-mixed. Dilution and evaporation of volatile organic compounds in a surface water body the size of Lake Calumet (roughly 1.5 square miles) is inevitable. The primary exposure route for aquatic organisms inhabiting Lake Calumet was assumed to be respiration (i.e., uptake of contaminants over the water/gill interface) (Table 3-3). Although incidental ingestion of suspended or bottom sediments while foraging by benthic organisms is possible, uptake of COPCs present in the water column or in sediment pore water across the gills was assumed to be the primary pathway of exposure. While ingestion of sediments and prey may be important exposure pathways, any attempt to model the transfer of COPCs from sediments and prey to aquatic receptors would introduce significant uncertainties into the exposure assessment.

### **3.4 Determining Exposure Point Concentrations for Surface Water and Sediments**

Exposure point concentrations are the upper-bound estimate of chemical concentrations in the various environmental media to which ecological receptors may be exposed. They are based on monitoring data obtained during the RFI investigations. The reasonable maximum exposure (RME) scenario, which is defined as the highest exposure that is reasonably expected to occur at a facility (i.e., well above average) (USEPA, 1989d), was used to provide a conservative (health-protective) estimate of potential impacts to exposed organisms. Since the RME terminology refers to an exposure scenario, it has been used to evaluate impacts to both populations and individuals. Since the RME scenario uses a mixture of conservative (health-protective) assumptions and upper-bound environmental concentration data, it may overestimate



actual exposures to some receptors.

USEPA defines the concentration used to estimate RME exposures to a chemical as the 95 percent upper confidence limit (UCL) of the arithmetic mean (USEPA, 1992b) or the maximum observed concentration, whichever is less. Arithmetic mean concentrations are typically used because: (1) they represent the most reasonable estimate for comparison with chronic non-carcinogenic and carcinogenic effects criteria, and (2) they represent a reasonable estimate of the concentration to which individuals are likely to be exposed over time.

As noted in Section 2.3, COPCs for sediments were separated in "Lake Calumet" samples and "near-pier" samples, or those collected near the CWMCS facility. A Kolmogorov-Smirnov (K-S) goodness-of-fit test using Lilliefors correction was used to determine if the near-pier sample data (n = 28 for all organics and metals of concern with the exception of heptachlor) were normally or lognormally distributed (Gilbert, 1987). Results of the K-S tests are shown in Table 2-3 for each COPC detected sediment samples collected near the CWMCS facility. If the data for a given chemical were shown to be normally distributed, UCL values were calculated using a one-sided confidence limit for the arithmetic mean (Gilbert, 1987) as demonstrated in this equation:

$$UCL = \bar{x} + t_{1-\alpha, n-1} \frac{s}{\sqrt{n}} \quad (3-1)$$

where  $\bar{x}$  is the arithmetic mean, s is the standard deviation of the arithmetic mean, n is sample size, t is the critical value of t for n-1 degrees of freedom at the 95 percent level of confidence, and n is the number of samples. To calculate the UCL for chemicals that were shown to be lognormally distributed, the data were first transformed using the natural logarithm function [ln(x) where x is a value from the data set] and the following equation (Gilbert, 1987):

$$UCL = e^{(\bar{x} + 0.5 s^2 + sH/\sqrt{n-1})} \quad (3-2)$$

where  $e$  is the base of the natural log (2.718),  $\bar{x}$  is the arithmetic mean of the log transformed data,  $s$  is the standard deviation of the transformed data,  $H$  is the  $H$  statistic from Gilbert (1987), and  $n$  is the number of samples. If the data fit neither a normal or a lognormal distribution (i.e., those labeled as "none" in Column 3 of Table 2-3), then a 95 percent confidence level was calculated assuming that the data were normally and lognormally distributed, and the higher UCL value was used in exposure calculations.

In both cases, analytical results below the ETC method detection limit were treated as equal to one-half the SQL and included in the calculation of mean and UCL values (USEPA, 1989d). Sampling results characterized with a "B" qualifier for inorganics or "J" qualifier for organics (i.e., the true value is less than the contract required quantitation limit but greater than the instrument detection limit) were also used in mean and upper-bound calculations. It is important to recognize that small data sets often have a large variance; consequently, the UCL may exceed the maximum value. In this case, USEPA (1989d; 1992b) recommends use of the maximum observed concentration of the affected COPC in the RME estimate.

Because of the uncertainty associated with estimating the extent of exposure to site-related metals, two exposure scenarios were developed. The use of single-value estimates, especially upper-bound analyses, does not provide adequate information to risk managers who must decide if the ecological risks are excessive (USEPA, 1992 F. Henry Habicht, II memo). Consequently, a second, and more plausible, exposure scenario considered is the average scenario, which uses best-estimates (usually mean values) of the exposure assumptions to characterize exposures. This exposure scenario is used to quantify more realistic estimates of potential ecological effects in cases where unacceptable risks were associated with RME estimates. The advantage of evaluating two exposure scenarios is that together they provide a broader perspective on the range of potential risks that ecological receptors may experience. The analytical data used to calculate exposure point concentrations for all media are included in Appendix A of this report.

Toluene was the only compound detected in more than five percent of the surface water samples collected in the vicinity of the CWMCS facility. Results of the K-S test done using all surface water data collected, the mean, standard deviation, 95 percent upper confidence limit, and maximum measured value for this compound are shown in Table 3-4. Similarly, Table 2-3 summarizes results of the K-S tests done using near-pier sediment data, the mean, standard deviation, 95 percent upper confidence limit, and maximum measured value for all metal and organic COPCs in sediment. The data presented in Tables 2-3 and 3-4 were used to assess the potential that aquatic populations may be experiencing chronic adverse effects from exposure to facility-related constituents.

#### **3.4.1 Derivation of Pore Water Concentrations**

The fact that few contaminants were detected in surface water relative to sediments indicates that sediments are likely acting as a reservoir as well as a potential source of contaminants to the water column. Sediments tend to integrate contaminants over long periods, while levels of COPCs in the water column tend to be less concentrated and more variable. Sediments are an important component of the ecosystem, because they provide habitat for benthic organisms. Generally, the surficial layer (the upper few inches) is the active portion of the sediments, while the deeper layers are more passive and constant.

Exposure to sediments was evaluated using an equilibrium partitioning approach to derive pore water concentrations. This approach has been adopted by USEPA for deriving sediment quality criteria (DiToro *et al.*, 1991). Since the potential biological effects of chemicals in sediment are better correlated to the concentration of chemicals in interstitial (pore) water versus the total sediment concentration, pore water concentrations were estimated. At the sediment-surface water interface, contaminants exist in dynamic equilibrium between interstitial water and bed sediments. The transfer of chemicals between the solid and aqueous phases occurs by means of rapid molecular exchange. This exchange is continuous, thereby maintaining the system at equilibrium (Pavlou, 1984). The steady-state concentration in either phase can be estimated as a function of the known concentration in the other phase and a chemical-specific equilibrium

partitioning coefficient. The measured concentration of COPCs in sediments was used to estimate partitioning between adsorbed concentrations in sediment and concentrations in sediment pore water using the equation (DiToro *et al.*, 1991):

$$C_{PORE} = \frac{C_{SED}}{K_p} \quad (3-3)$$

where  $C_{PORE}$  equals the concentration of COPCs in sediment pore water (mg/L),  $C_{SED}$  is the measured concentration of COPCs in bulk sediments (mg/kg dry weight), and  $K_p$  is the sediment-to-water partitioning coefficient. The sediment-water partitioning coefficient ( $K_p$ ) reflects the extent to which chemicals sorbed to sediments will partition into pore water. By normalizing  $K_p$  values for organics on the basis of organic carbon content of the sediment, variations in  $K_p$  due to differences in sediment type can be minimized. Organic carbon normalized  $K_p$  values for non-polar organic chemicals were estimated using the equation (DiToro *et al.*, 1991):

$$K_p = f_{oc} \times K_{oc} \quad (3-4)$$

where  $f_{oc}$  is the mass fraction of organic carbon for sediments taken from locations near the CWMCS facility (kg organic carbon/kg dry weight), and  $K_{oc}$  is the sediment-water partitioning coefficient normalized for organic carbon.  $K_{oc}$  values for the COPCs were taken from USEPA (1986a) and are shown in Table 3-5 along with the calculated concentration of organic COPCs in interstitial (pore) water. The fraction of organic carbon was assumed to be 2.9%, which is the mean of 37 surficial sediments analyzed from Lake Calumet between 1986 and 1987 (IDENR, 1988). An example calculation for anthracene is presented below.

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$K_{oc} = 14,000 \text{ L/kg}$  and  $f_{oc} = 0.029$  (2.9%).  $K_p = 14,000 * 0.029 = 406 \text{ L/kg}$ . The estimated upper-bound concentration of anthracene in pore water equals the measured upper-bound concentration in sediment  $1436 \mu\text{g/kg}$  divided by  $K_p$  ( $406 \text{ L/kg}$ ) equals  $3.5 \mu\text{g/L}$  (Table 3-5).

---

For metals,  $K_d$  values were used to derive sediment pore water concentrations (i.e.,  $K_p = K_d$ ).

$K_d$  values and the estimated concentration of metals in pore water are listed in Table 3-6.

Important assumptions in the assessment of sediments are: (1) the sediments and surface water are in dynamic equilibrium; (2) chemicals are bioavailable to aquatic life only when they are dissolved in the pore water rather than sorbed to bottom or suspended sediments; and (3) ingestion of contaminated sediments while foraging is not a significant exposure pathway relative to the direct transfer of chemicals across the gill membrane. Hence, the equilibrium partitioning approach assumes that exposure to benthic organisms is via pore water versus direct ingestion of sediment. One advantage of the equilibrium partitioning approach is that if equilibrium between pore water and sediment is assumed, then the effective, biologically-relevant concentration is the same regardless of the exposure route.

Limitations of the equilibrium partitioning approach include the following. First, there is a great deal of uncertainty associated with the partitioning coefficients used, since these coefficients vary with environmental conditions. The environmental factors and physical and chemical processes that mediate the movement of trace metals in sediments are not well understood. Second, AWQC are not available for all COPCs. This problem was addressed by comparing estimated pore water concentrations with levels reported to cause adverse effects in key aquatic species. Third, this approach does not reflect the possible synergistic or antagonistic interactions between chemicals that may intensify or diminish the potential toxicity of a given chemical. Although the concentration of several chemicals may not exceed their individual AWQC, the interaction of these chemicals could still cause adverse impacts on aquatic receptors.

### **3.5 Estimating Dose for Aquatic Receptors**

It is not necessary to calculate dose estimates for aquatic receptors, since effects for the key species were assessed by comparing the measured concentration of COPCs in surface water and sediments or the estimated concentration of COPCs in pore water to national and state criteria and to chemical-specific and species-specific toxicological benchmark data. Results of facility-specific media sampling were used to estimate the potential toxicity of chemicals detected in

Lake Calumet COPCs. COPCs for surface water and sediment were selected in Section 2.0 and are summarized in Table 2-5.

**TABLE 3-1**  
**ILLINOIS STATE-LISTED THREATENED OR ENDANGERED SPECIES**  
**POTENTIALLY OCCURRING IN THE LAKE CALUMET AREA**

<b>SPECIES</b>	<b>THREATENED</b>	<b>ENDANGERED</b>
Marsh-speedwell ( <i>Veronica scutellata</i> )	X	
Awned sedge ( <i>Carex atherodes</i> )	X	
Little green sedge ( <i>Carex viridula</i> )		X
Fewflower spike rush ( <i>Eleocharis pauciflora</i> )		X
Richardson rush ( <i>Juncus alpinus</i> )		X
Small white lady's slipper ( <i>Cypripedium canadum</i> )		X
Black-crowned night heron ( <i>Nycticorax nycticorax</i> )		X
Common moorhen ( <i>Gallinula chloropus</i> )	X	
Yellow-headed blackbird ( <i>Xanthocephalus xanthocephalus</i> )		X
Pied-billed grebe ( <i>Podilymbus podiceps</i> )		X
Upland sandpiper ( <i>Bartramia longicauda</i> )		X
Wilson's phalarope ( <i>Phalaropus tricolor</i> )		X
Black tern ( <i>Chlidonas niger</i> )		X
Great egret ( <i>Casmerodius albus</i> )		X
Least bittern ( <i>Ixobrychus exilis</i> )		X
American bittern ( <i>Botaurus lentiginosus</i> )		X
Yellow rail ( <i>Catournicops noveboracensis</i> )		X
Red-shouldered hawk ( <i>Buteo lineatus</i> )		X
Northern harrier ( <i>Circus cyaneus</i> )		X
Banded killifish ( <i>Fundulus diaphanus</i> )	X	
Iowa darter ( <i>Etheostoma exile</i> )	X	

**TABLE 3-2**  
**KEY RECEPTORS SELECTED TO MODEL POTENTIAL EFFECTS**  
**FROM EXPOSURE TO FACILITY-RELATED CONTAMINANTS AND**  
**THE RATIONALE FOR SELECTING EACH SPECIES**

Key Species Selected	Rationale
Centrarchids (sunfish and bass) and Salmonids (salmon and trout)	<ul style="list-style-type: none"> <li>- Piscivore (feeds on other small fish)</li> <li>- Pelagic species (inhabits the water column).</li> <li>- Present in the area</li> <li>- Toxicological data are readily available</li> <li>- Serves as an integrator of aquatic exposures</li> <li>- Some centrarchids (e.g., largemouth bass) are important sport (game) species</li> <li>- Has gills that are in direct contact with the water column</li> </ul>
Ictalurids (catfish and bullheads)	<ul style="list-style-type: none"> <li>- Benthic (likely to have direct contact with sediments).</li> <li>- Bottom-feeder (feeds primarily on organisms that live in the sediment)</li> <li>- Present in the area</li> <li>- Toxicological data are readily available</li> <li>- Some ictalurids (e.g., bullhead and catfish) are important sport (game) species</li> <li>- Serves as an integrator of aquatic exposures</li> <li>- Has gills that are in direct contact with the water column</li> </ul>
Cyprinids (minnows and goldfish)	<ul style="list-style-type: none"> <li>- Small fish that are key prey species for larger, piscivorous fish</li> <li>- Present in the area</li> <li>- Toxicological data are readily available</li> <li>- Some species (e.g., the fathead minnow) exhibits a toxicological sensitivity to many chemicals</li> <li>- Has gills that are in direct contact with the water column</li> </ul>
Water column invertebrates (e.g., Daphnia sp., copepods, amphipods)	<ul style="list-style-type: none"> <li>- Are key prey species for fish</li> <li>- Present in the area</li> <li>- Toxicological data are readily available</li> <li>- Are in direct contact with the water column</li> <li>- Some (e.g., Daphnia) exhibit a toxicological sensitivity to many chemicals</li> </ul>
Benthic invertebrates (e.g., worm, midge)	<ul style="list-style-type: none"> <li>- Have direct contact with sediments.</li> <li>- Are prey for many fish species</li> <li>- Present in the area</li> <li>- Toxicological data are readily available</li> </ul>



**TABLE 3-3**  
**POTENTIAL EXPOSURE PATHWAYS FOR AQUATIC RECEPTORS**

Pathway	Evaluated ?	Rationale
Direct ingestion of sediments	No	Although incidental ingestion of suspended or bottom sediments while foraging by benthic organisms is possible, uptake of COPCs across the gills is assumed to be the primary pathway of exposure.
Dermal contact with surface water or sediments	No	It is unlikely that substantial amounts of COPCs would penetrate the dermal or chitinous layer of most organisms. Since aquatic organisms are likely to receive most of their dose from exchange across the gills, dermal uptake of COPCs was not quantified.
Ingestion of prey	No	Although prey may accumulate chemicals of concern, there is currently no reliable means of modeling such exposures. While this may be an important exposure pathway, attempts to model intakes from this pathway would introduce great uncertainty into the exposure assessment.
Uptake across the gill membrane	Yes	Aquatic organisms can accumulate chemicals at levels much higher than those measured in the surrounding water or sediment.

TABLE 3-4

RESULTS OF THE KOLMOGOROV-SMIRNOV GOODNESS OF FIT TEST AND THE MEAN, STANDARD DEVIATION, AND UPPER-BOUND CONCENTRATION FOR TOLUENE IN SURFACE WATER

Chemical	Sample Size <sup>a</sup>	Distribution	Significance Level <sup>b</sup>	Mean ( $\mu\text{g/kg}$ )	Standard Deviation ( $\mu\text{g/kg}$ )	H or t Statistic	95% Upper Confidence Limit for the Distribution ( $\mu\text{g/kg}$ )	Maximum Measured Value ( $\mu\text{g/kg}$ )
Toluene								4.1

<sup>a</sup> All surface water samples collected during Phase I and II investigations.

<sup>b</sup> The data were assumed to fit the distribution if the results of the K-S test are significant at the 95% level of confidence.

<sup>c</sup> Arithmetic means are reported for chemicals shown to be normally distributed, while the arithmetic mean of the log-transformed data is reported for chemicals shown to be lognormally distributed.

<sup>d</sup> Arithmetic standard deviations are reported for chemicals shown to be normally distributed, while the arithmetic standard deviation of the log-transformed data is reported for chemicals shown to be lognormally distributed.

<sup>e</sup> The H statistic and Equation 3-2 were used to calculate upper confidence limits (UCLs) for chemicals with a lognormal distribution, lognormal) that yielded the higher UCL value.

<sup>f</sup> Chemicals whose data did not fit any distribution (i.e., those labeled "none" in column three) were assumed to fit the distribution (normal or lognormal) that yielded the higher UCL value.

**TABLE 3-5**  
**K<sub>oc</sub> VALUES, ESTIMATED K<sub>p</sub> VALUES, AND ESTIMATED PORE WATER**  
**CONCENTRATIONS FOR ORGANIC CHEMICALS OF POTENTIAL CONCERN IN SEDIMENT**

Chemical	K <sub>oc</sub> (mL/g) <sup>a</sup>	Estimated K <sub>p</sub> Value (L/kg) <sup>b</sup>	Upper-Bound (95 UCL) Concentration in Sediment Near the CWMCS Facility (µg/kg dry weight) <sup>c</sup>	Estimated Upper-Bound Concentration in Pore Water (µg/L) <sup>d</sup>	Mean Concentration in Sediments (µg/kg dry weight) <sup>c</sup>	Estimated Mean Pore Water Concentration (µg/L) <sup>d</sup>
Acenaphthene	4600	133.4	2148	16.1	839	6.29
Anthracene	14,000	406	1436	3.5	1203	2.96
Benz(a)anthracene	1.38x10 <sup>6</sup>	40,020	8802	0.22	3419	0.09
Benzo(a)pyrene	5.5x10 <sup>6</sup>	159,500	2100	0.01	1765	0.01
Benzo(b)fluoranthene	5.5x10 <sup>5</sup>	15,950	3932	0.25	3200	0.20
Benzo(k)fluoranthene	5.5x10 <sup>5</sup>	15,950	1992	0.12	1666	0.10
Benzo(ghi)perylene	1.6x10 <sup>6</sup>	46,000	4863	0.11	1760	0.04
Chrysene	2.0x10 <sup>5</sup>	5800	2178	0.38	1547	0.27
1,2-trans-Dichloroethylene	59	1.71	2.4	1.4	1.7	1.0
Diethyl phthalate	142	4.1	7423	1810.5	6150	1500
Fluoranthene	38,000	1102	3681	3.3	2184	1.98
Fluorene	7300	212	1428	6.7	1192	5.62
Heptachlor	12,000	348	49.4	0.14	38.7	0.11
Indeno(1,2,3-cd)pyrene	1.6x10 <sup>6</sup>	46,400	3271	0.07	2664	0.06
Methylene chloride	8.8	0.3	137	456.7	10.6	35.3
Naphthalene	940	27.3	1261	46.2	1054	38.6
Phenanthrene	14,000	406	4499	11.1	3734	9.2
Phenol	14.2	0.41	1178	2873.2	1007	2456.1
Pyrene	38,000	1102	3361	3.05	2538	2.3
Toluene	300	8.7	4.7	0.54	3.9	0.45

<sup>a</sup> Taken from EPA (1986a)

<sup>b</sup>  $K_p = K_{oc} \times f_{oc}$ ,  $f_{oc}$  equals 0.029 (2.9%), which is the mean total organic carbon content of 37 surficial sediment samples analyzed from Lake Calumet (IDENR, 1988).

<sup>c</sup> Upper-bound and mean concentrations are based on all samples taken from near the CWMCS facility only (i.e., Lake Calumet sediment samples were not included) assuming that non-detects were equal to one-half the SQL. Upper-bound (95% upper confidence limit) and mean values are listed in Table 2-3.

<sup>d</sup> Pore water concentration equals the concentration in sediment divided by  $K_p$ .

**TABLE 3-6**  
**K<sub>d</sub> VALUES AND ESTIMATED PORE WATER**  
**CONCENTRATIONS FOR METALS OF POTENTIAL CONCERN IN SEDIMENT**

<b>Metal</b>	<b>Expected K<sub>d</sub> (mL/g)<sup>a</sup></b>	<b>Upper-Bound (95 UCL) Concentration in Sediment Near the CWMCS Facility (µg/kg dry weight)<sup>b</sup></b>	<b>Estimated Upper-Bound Concentration in Pore Water (µg/L)<sup>c</sup></b>	<b>Mean Concentration in Sediments (µg/kg dry weight)<sup>b</sup></b>	<b>Estimated Mean Pore Water Concentration (µg/L)<sup>c</sup></b>
Antimony	45	8956	199.0	7148	158.8
Arsenic	200	24,564	122.8	16,614	83.1
Beryllium	650	965	1.48	734	1.1
Chromium	850	57,893	68.1	33,124	39.0
Lead	400	138,092	345.2	91,035	227.6
Mercury	10	231	23.1	118	11.8
Silver	46	1442	31.35	1088	23.65
Zinc	38	274,855	7233.0	236,786	6231.2

<sup>a</sup> Taken from Baes *et al.* (1984).

<sup>b</sup> Upper-bound and mean concentrations are based on all samples taken from near the CWMCS facility only (i.e., Lake Calumet sediment samples were not included) assuming that non-detects were equal to one-half the SQL. Upper-bound (95 upper confidence limit) and mean concentrations are listed in Table 2-3.

<sup>c</sup> Pore water concentration equals the concentration in sediment divided by K<sub>d</sub>, since for metals, K<sub>d</sub> is equivalent to K<sub>p</sub>.

#### 4.0 SELECTION OF ECOLOGICAL ENDPOINTS

This section describes methods for quantitatively evaluating exposures relative to ecological endpoints. Ecological endpoints are characteristics of an ecological system that may be affected by facility-related COPCs and as such represents the actual environmental values to be protected. Meaningful endpoints are those that characterize the relationship between contaminant levels (environmental concentrations) and potential adverse effects. Since this ERA focuses on aquatic organisms due to their greater potential for exposure to facility-related contaminants, ecological endpoints were developed for the aquatic community only.

Assessment endpoints are formal expressions of the actual environmental parameter to be protected (e.g., reduction of key population members or disruption of community structure). Potential assessment endpoints for the CWMCS facility include the following:

- Is a significant reduction in benthic or water column populations possible?
- Is water quality in Lake Calumet near the CWMCS facility sufficient to support a diverse natural aquatic community? **In other words, is exposure to facility-related COPCs by aquatic organisms inhabiting Lake Calumet near the CWMCS pier likely to substantially alter species diversity or abundance?**
- Could exposure to facility-related COPCs result in adverse chronic toxic effects in aquatic populations?

Measurement endpoints are measurable or quantifiable characteristics that can be directly related to an assessment endpoint. Measurement endpoints corresponding to the assessment endpoints outlined above include:

- The measured concentrations of COPCs in surface water and sediment within Lake Calumet near the CWMCS pier do not exceed federal or state chronic AWQC for the protection of freshwater aquatic life.

- The measured concentrations of COPCs in sediment within Lake Calumet near the CWMCS pier do not exceed available federal or state sediment quality criteria.
- The measured concentrations of COPCs in surface water within Lake Calumet near the CWMCS pier do not exceed toxicological levels known to cause adverse chronic effects in key species of potential concern.
- Estimated concentrations of COPCs in sediment pore water within Lake Calumet near the CWMCS facility do not exceed federal or state chronic AWQC.
- Estimated concentrations of COPCs in sediment pore water within Lake Calumet near the CWMCS facility do not exceed toxicological levels known to cause adverse chronic effects in key species of potential concern.

These endpoints provide a benchmark for comparative purposes. Ecologic endpoints are only relative guidelines for prioritizing potential effects and should not be utilized as rigid standards (personal communication, USEPA Region VIII, Chief Toxicologist, Chris Weis, July, 1992). Hence, no one ecological endpoint can or should be used to determine if adverse effects to exposed populations are likely.

## 5.0 EFFECTS ASSESSMENT

The effects assessment evaluates the nature and extent of adverse effects from exposure to facility-related chemicals. It consists of a hazard evaluation and a dose-response assessment. The hazard evaluation involves a comprehensive review of toxicity data for multiple species to identify the severity of toxic properties associated with the COPCs. Once the potential toxicity of a chemical has been established, the next step is to determine the amount of chemical exposure that may result in adverse ecological effects in key species (*i.e.*, dose-response assessment). Thus, the effects assessment evaluates the increased likelihood of adverse ecological effects as a result of exposure to facility-related chemicals.

Chronic toxicity data for the key ecological receptors (or an appropriate surrogate species) were used in this assessment. Estimating chronic instead of acute effects is appropriate in this case for the following reasons: (1) environmental receptors have been exposed to various contaminants present in Lake Calumet for more than 100 years (IDENR, 1988), (2) potential releases of facility-related contaminants into Lake Calumet are limited (see Section 4.2.5 of the RFI, CWMCS, 1993), and (3) chronic effects are a better measure of long-term impacts than acute effects. Sources of the toxicity values used in this ERA to evaluate potential adverse effects to aquatic organisms include Fish and Wildlife Service (FWS) Contaminant Hazard Synoptic Reviews, USEPA Health Effects Assessment and Water Quality Criteria documents, USEPA's on-line AQUIRE database, and other current toxicological literature. Toxicity data for surrogate species (*i.e.*, for species other than the species of concern) were used only if data for the key species of concern were not available.

Phase I of this ERA evaluates potential adverse effects to key species based upon their exposure to COPCs in surface water and sediment using IEPA and national Ambient Water Quality Criteria (AWQC) for the protection of aquatic life. In addition, the measured levels of COPCs in sediment were compared to federal sediment quality criteria where available. To be protective of all potential receptors, USEPA usually calculates national AWQC using toxicity

test results for a variety of organisms, including sensitive species (*i.e.*, those species that are more susceptible to contaminant exposure than others). As these sensitive species may or may not be present at the site, these criteria may be too stringent (or otherwise inappropriate) for application here. Since site-specific biota sampling was not done, it is not known for certain if sensitive species currently inhabit Lake Calumet near the CWMCS facility; Conversely, IDENR (1988) reported that in 1981 and 1982, various salmon and trout species, which are generally considered sensitive cold water species, were observed in Lake Calumet. These data indicate that Lake Calumet provides suitable habitat for sensitive cold water species. Thus, the potential toxicity (*i.e.*, potential for adverse effects) was further evaluated using the Toxicity Quotient (TQ) approach for those chemicals whose measured or estimated concentrations in surface water, pore water, or sediments exceed state or federal criteria.

### 5.1 Toxicity Quotient Approach

Toxicity quotients (TQs) are a general method for assessing the environmental hazards of chemicals. The TQ approach is routinely used by USEPA as the simplest, quantitative method available for estimating risks to ecological receptors (USEPA, 1992a). The TQ approach was used to evaluate the potential for adverse effects to receptors within the same ecologic group. As stated in Section 3.0, selection of key receptor groups was designed to minimize the possibility that other species might be more exposed than the selected key groups and to include representation of sensitive organisms. Thus, by using toxicological data for the key receptor species selected for this facility, it is appropriate to conclude that other species within the same ecologic group are unlikely to be adversely affected. For example, if centrarchids (a key receptor species) are not expected to experience adverse effects, then it is reasonable to assume that other pelagic fish species would also be unlikely to experience adverse effects. These criteria would not apply to T&E species, however, as they are typically given special, more stringent individual consideration in an ERA.

The TQ method is the direct arithmetic comparison of a concentration from a laboratory toxicity test with an expected or measured environmental concentration (Barnthouse and Suter, 1986).



TQs are defined as the exposure point concentration (mg/L) for aquatic receptors divided by chronic Toxicity Reference Values (TRVs) in mg/L as exemplified in the following equation:

$$\text{Toxicity Quotient} = \frac{\text{Exposure Concentration}}{\text{Toxicity Reference Value}} \quad (5-1)$$

A TRV is an exposure estimate for a receptor group, including sensitive subgroups, that is not likely to cause appreciable deleterious effects in exposed organisms. Typically, ecological risk assessment assumes that if the TRV is not exceeded, then the species of interest will be protected (Suter *et al.*, 1983). In ecological risk assessment, TRVs can be taken directly from the literature or can be generated using various predictive regression models.

## 5.2 Derivation of Toxicity Reference Values

The derivation of TRVs depends on whether the desired toxicological data are available for the endpoints and species of concern. The Maximum Acceptable Toxicant Concentration (MATC) is a standard chronic test endpoint for aquatic toxicity testing. It is the calculated or approximated threshold for statistically significant effects on growth, reproduction, or survival. The MATC is defined as the effects threshold at or below which adverse chronic effects are not expected to occur (Suter, 1992). Its point estimate is the geometric mean of the highest no-observable-effect concentration and the lowest concentration causing a statistically significant effect on growth, reproduction, or survival in a life-cycle toxicity test (Mount and Stephan, 1967; 1969). Because the MATC is linked to a statistical threshold versus a specific magnitude of effect means that it can correspond to severe effects on much of the population (Suter *et al.*, 1987).

If MATCs were available in the literature for aquatic receptors of concern these data were used in the effects assessment. For chemicals for which MATCs were not available, they were estimated using LC<sub>50</sub> data (the concentration causing death in 50 percent of exposed individuals) and the predictive regression models developed by Suter *et al.* (1987) and Suter (1986).

Toxicological benchmark data that specify an  $LC_{50}$  are the most often measured endpoint in aquatic toxicity testing and have been used by USEPA to establish national Ambient Water Quality Criteria.  $LC_{50}$  data for benthic invertebrates and ictalurids (bottom dwelling vertebrates) were used to derive chronic MATCs for sediment COPCs, since these receptors are expected to have more prolonged and direct contact with sediments than pelagic species. The term chronic refers to the duration of the test (not to the observed effect) and is defined as an exposure duration greater than 10% of the organism's lifespan (Suter *et al.*, 1987). The implication of developing chronic TRVs is that either the toxicant or its effects accumulate in the organism over time, resulting in effects that are not observed following brief exposures (Suter *et al.*, 1987).

Chronic MATCs for organic COPCs were estimated using the following predictive equations developed by Suter *et al.* (1987) and Suter (1986) for vertebrates and invertebrates, respectively.

$$\log MATC (\mu g/L) = -1.51 + 1.07 \times \log LC_{50} (\mu g/L) \quad (5-2)$$

$$\log Daphnia MATC (\mu g/L) = -1.30 + 1.11 \times \log LC_{50} (\mu g/L) \quad (5-3)$$

Similar regression equations were used to develop MATCs for the metals of concern as shown below:

$$\log MATC (\mu g/L) = -0.70 + 0.73 \times \log LC_{50} (\mu g/L) \quad (5-4)$$

$$\log Daphnia MATC (\mu g/L) = -1.08 + 0.96 \times \log LC_{50} (\mu g/L) \quad (5-5)$$

Specifically, these models were used to extrapolate the available data (i.e.,  $LC_{50}$ s) to the parameter of interest (i.e., the chronic MATC). The primary advantage of using these models is that they employ statistical inference to account for data gaps and assumptions that are often

treated less accurately or ignored (Suter *et al.*, 1987).

The data set used to generate these regression equations was compiled from published results of life cycle, partial life cycle, and early life stage tests conducted on freshwater fish and invertebrates (*Daphnia sp.*). It includes 151 tests for 93 chemicals on 18 species (Suter *et al.*, 1987). The vertebrate regression models for organics and metals are based on 98 and 25 tests, respectively, while the invertebrate (*Daphnia spp.*) models for organics and metals are based on 57 and 27 tests, respectively. Concentration-response data were averaged across duplicates within the same study. Data were eliminated if more than 30 percent mortality occurred in the control population. The LC<sub>50</sub> and chronic data used for the acute-to-chronic extrapolations were taken from the same study so that consistent fish populations and water concentrations were used. Invertebrate chronic data are limited to life-cycle tests with *Daphnia spp.*, as there are little chronic data for any other freshwater invertebrate species (Suter, 1986). The data set used to generate this regression equation was compiled from published results of life cycle tests done on members of the *Daphnia* genus taken from the 1980 and 1984 *Ambient Water Quality Criteria* support documents. It includes 27 tests for nine chemicals (Suter, 1986).

### 5.3 Effects Assessment for Surface Water COPC

The potential toxicity of COPCs in surface water to aquatic organisms that inhabit areas of Lake Calumet in the vicinity of the pier was evaluated using the following hierarchical approach:

1. The upper-bound (95 percent upper confidence limit) measured concentration of COPCs in surface water was compared to IEPA and national chronic AWQC where available. If the upper-bound concentration of a given chemical in surface water did not exceed state or federal chronic AWQC, adverse effects from exposure to that chemical by aquatic organisms are not expected, and no further evaluation of that chemical was required.
2. For those chemicals whose upper-bound concentration in surface water exceeded IEPA and federal chronic AWQC, or for those chemicals for which state or federal criteria were not available, TRVs (MATCs) and TQs were calculated as described in Sections 5.1 and 5.2.

Toluene is the only COPC for surface water. Since State and federal chronic AWQC were not available for toluene, TRVs and TQs were calculated for toluene. The TQ approach was not used to eliminate COPCs. If the measured concentration of chemical in surface water (the exposure concentration referred to in Equation 5-1) is higher than the MATC (the Toxicity Reference Value identified in Equation 5-1), then the TQ for that chemical would be greater than 1.

### 5.3.1 Derivation of TRVs for Surface Water COPC

The evaluation of toluene in surface water near the pier focused on potential adverse impacts to pelagic (water column) organisms, primarily centrarchids (sunfish and bass), cyprinids (minnows), salmonids (salmon and trout), and water column invertebrates (e.g., Daphnia, amphipods, and copepods). Pelagic organisms tend to inhabit the water column exclusively. For example, centrarchids tend to feed primarily on other pelagic organisms. Although they might venture into bottom areas following prey as they forages near the bottom, they were assumed to spend minimal time near the bottom. When actively foraging for minnows and other small prey, centrarchids tend to feed near the shore (Pflieger, 1975). Similarly, most water column invertebrates inhabit and feed among vegetation in the mid- to upper portions of the water column. Some species, such as amphipods, however, will go down and forage near bottom substrate, although they are not known to burrow into bottom sediments (Pflieger, 1975). According to Pflieger (1975), cyprinids live in schools in midwater and occasionally near the bottom. Thus, pelagic organisms were assumed to be the aquatic receptors most likely to be exposed to the toluene in surface water. Inherent in this approach is the assumption that any chemical releases from the sediment into the surrounding water would be (1) diluted as they mixed throughout the water column, (2) reflected in the surface water data collected, and (3) that adverse population-level effects on benthic organisms from exposure to toluene in surface water are not probable.

The toxicity of toluene to pelagic organisms that are known or suspected to inhabit Lake Calumet are summarized in Table 1 of Appendix B. Equations 5-2 and 5-3 were used to convert

the LC<sub>50</sub> data to MATCs. Information on the mean, maximum, UCL, and standard deviation concentrations for toluene in surface water are listed in Table 3-4. Minimum, maximum, and mean MATCs are summarized in Table 5-1 for toluene. TQ results are presented and discussed in Chapter 7. Specifically, the measured concentration of toluene in surface water is compared to the MATC for toluene in Table 7-5.

#### **5.4 Effects Assessment for Sediment COPCs**

The potential toxicity of COPCs in sediments was evaluated using the following hierarchical approach:

1. The upper-bound concentration of COPCs in sediment was compared to federal EPA Sediment Quality Criteria (SQC) (USEPA, 1988; 1994). Federal SQC are available only for a limited number of chemicals, and state SQC were not available for any of the sediment COPCs. If the upper-bound concentration of a COPC in near-pier sediments did not exceed federal SQC, adverse effects from exposure to that chemical by aquatic organisms are not expected, and no further evaluation of that chemical was required.
2. If AWQC were not available for a given COPC or the upper-bound concentration in sediments near the pier exceeded available criteria, then the estimated upper-bound concentration of COPCs in sediment pore water was compared to national and state chronic AWQC for the protection of aquatic life. If the upper-bound pore water concentration did not exceed state and federal AWQC, adverse effects from exposure to that chemical by aquatic organisms are not expected, and no further evaluation of that chemical was required.
3. For those COPCs whose upper-bound pore water concentration exceeded AWQC, or those chemicals for which AWQC were not available, toxicity quotients (TQs) were calculated as described in Section 5.2.

Again, the TQ approach was not used to eliminate COPCs. If the measured or estimated concentration of a chemical in pore water or sediment (the exposure concentration referred to in Equation 5-1) is higher than the MATC (the Toxicity Reference Value identified in Equation 5-1), then the TQ for that chemical would be greater than 1. TQ results are presented and discussed in Chapter 7 (Risk Characterization).

As noted above, SQC are available for a limited number of chemicals only. USEPA has reported interim SQC values primarily for nonpolar hydrophobic organic contaminants. Caution should be used when applying these criteria as they are not final values that have been peer-reviewed by the scientific community. Table 5-2 shows that SQC are available for four of the 17 organic and no metals of concern in sediment: acenaphthene, heptachlor, fluoranthene, and phenanthrene. Of these four chemicals, the upper-bound measured concentration of acenaphthene, fluoranthene, and phenanthrene in sediments does not exceed their respective SQCs; hence, exposure to these chemicals in sediments is not expected to cause adverse effects in aquatic receptors. The upper-bound level of heptachlor did exceed its respective SQC, which suggests that further evaluation of the potential adverse effects associated with exposure to this chemicals is warranted.

Next, the upper-bound estimated concentration of chemicals in sediment pore water (Tables 3-5 and 3-6) was compared to federal and state chronic Ambient Water Quality Criteria (AWQC) for the protection of freshwater aquatic life. If chronic AWQC were not available for a given chemical, acute values were used if available. This approach is conservative in that it assumes that the estimated pore water concentration exists throughout the water column. In other words, dilution of pore water concentrations as they mix within the water column is not accounted for. Table 5-3 shows that the estimated upper-bound pore water concentration does not exceed chronic AWQC for antimony, arsenic, beryllium, chromium, and lead. Hence, adverse effects from exposure to these chemicals by aquatic organisms are not expected and no further toxicological evaluation of these chemicals was required. The remaining three metals (mercury, silver, and zinc) and 16 organics (anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(ghi)perylene, chrysene, 1,2-trans-dichloroethylene, diethyl phthalate, fluorene, heptachlor, indeno(123-cd)pyrene, methylene chloride, naphthalene, phenol, and pyrene) for which AWQC were not available or whose upper-bound pore water concentration exceeded AWQC were evaluated using the TQ approach.

#### **5.4.1 Derivation of TRVs for the Organic Chemicals of Potential Concern in Sediment**

The evaluation of the organic COPCs detected in sediments near the pier focused on potential adverse impacts to benthic invertebrates and ictalurids, because both are bottom dwelling organisms. Bottom dwelling organisms, who live in direct contact with bottom sediments, are most likely to be adversely affected by the accumulation of chemicals in sediment. Potential toxic effects of COPCs detected in sediments to pelagic organisms that inhabit the water column (e.g., salmonids, centrarchids, cyprinids, and water column invertebrates) were not evaluated. Pelagic organisms are not likely to spend a substantial amount of time near the bottom. Hence, population-level adverse impacts on pelagic species from exposure to COPCs measured in sediments near the facility are not expected. As a result, toxicological data for benthic invertebrates and ictalurids were used to derive TRVs for sediment COPCs. Toxicological data for pelagic organisms were used only if no data were available for benthic invertebrates and ictalurids.

Toxicity data used to predict chronic MATCs for benthic organisms are shown in Table 2 of Appendix B for PAHs. Because limited toxicological data were available specifically for bottom dwelling organisms and PAHs, all toxicological data available for any PAH was included. This approach could over- or underestimate the true risk to benthic organisms, since they may not be equally sensitive to all PAHs.  $LC_{50}$  data reported in Table 2 of Appendix B were converted to MATCs using Equation 5-3, since no  $LC_{50}$  data were available for vertebrate species. The range of  $LC_{50}$  data available for benthic invertebrates and ictalurids and the minimum and mean MATCs are summarized in Table 5-4. MATCs were calculated for each individual  $LC_{50}$  value using Equation 5-3 and then the mean MATC was calculated.

Only two data points,  $LC_{50}$ s, were available for 1,2-trans-dichloroethylene and phenol. No data for benthic organisms were available for 1,2-trans-dichloroethylene. Etnier *et al.* (1987) reported a 96-hour  $LC_{50}$  of 222,000  $\mu\text{g/L}$  for *Daphnia magna* exposed to 1,2-trans-dichloroethylene. USEPA (1980a) reported a 96-hour  $LC_{50}$  of 135,000  $\mu\text{g/L}$  for bluegill (a centrarchid). Equations 5-3 and 5-2 were used to derive corresponding MATCs of 43,098  $\mu\text{g/L}$  and 9538  $\mu\text{g/L}$ , respectively. Etnier *et al.* (1987) reported  $LC_{50}$ s of 31,000  $\mu\text{g/L}$  and 16,700  $\mu\text{g/L}$  for adult and juvenile channel catfish (*Ictalurus punctatus*), respectively, exposed to phenol.

Equation 5-2 was used to derive corresponding MATCs of 1019  $\mu\text{g/L}$  and 1976  $\mu\text{g/L}$ , respectively. Minimum, maximum, and mean MATCs for 1,2-trans-dichloroethylene and phenol are shown in Table 5-4.

Toxicity data for ictalurids and benthic invertebrates exposed to phthalate esters are summarized in Table 3 of Appendix B. As was done for PAHs, all toxicological data available for any phthalate ester, regardless of whether that particular compound was detected in facility sediments, was included. Although this approach is uncertain, sufficient toxicological data specifically for diethyl phthalate were not available. Toxicological data for benthic invertebrates and ictalurids exposed to methylene chloride were not found in the literature. Hence, data available for pelagic organisms were used to calculate MATCs for methylene chloride (Table 4 of Appendix B). Equation 5-2 was used to calculate a MATCs from the  $\text{LC}_{50}$ s listed in Table 4 of Appendix B. Minimum, maximum, and mean MATCs for phthalate esters and methylene chloride are listed in Table 5-4.

#### **5.4.2 Derivation of TRVs for the Metals of Potential Concern in Sediment**

SQCs are not available for metals. Toxicity data used to predict chronic MATCs for benthic organisms are shown in Tables 5 and 6 of Appendix B for mercury and zinc, respectively. USEPA (1980b) reported an  $\text{LC}_{50}$  of 3200  $\mu\text{g/L}$  for midges (*Tanytarsus disimillis*) exposed to silver at a hardness of 48 mg  $\text{CaCO}_3/\text{L}$ . Equation 5-5 was used to derive an MATC of 193  $\mu\text{g/L}$  for silver. TRVs for these remaining metals of potential concern are shown in Table 5-5. For all metals, the lowest  $\text{LC}_{50}$  or MATC available for a benthic invertebrate or an ictalurid was used to generate the minimum MATC.  $\text{LC}_{50}$  data reported for both receptor groups were converted to MATCs using Equations 5-4 and 5-5 as appropriate before calculating the mean MATC.

### **5.5 Toxicity Profiles for Chemicals of Potential Concern**

This section presents general information and contaminant-specific discussions on the potential



toxicity of the surface water and sediment COPCs to aquatic receptors. The final list of COPCs for surface water and sediment is summarized in Table 2-5, while the rationale for selecting the chemicals as COPCs for these media is described in Section 2. The data presented below are not definitive in that organisms and populations may adapt to higher concentrations without indications of adverse effects, and some organisms and certain life stages may be more susceptible than others. There is no evidence to confirm that populations exposed to the COPCs will experience the effects outlined below. Toxicity profiles for the organic and metals of potential concern are summarized in Table 5.6.

**TABLE 5-1**  
**SUMMARY OF TOXICITY REFERENCE VALUES**  
**FOR TOLUENE AND PELAGIC ORGANISMS**

Receptor Group	Number of LC <sub>50</sub> Values Available	Minimum and Maximum MATCs (µg/L)	Arithmetic Mean MATC (µg/L)
Salmonids	1	145	145
Centrarchids	2	760 - 1503	1132
Cyprinids	4	1422 - 3840	2555
Water column invertebrates	2	10,087 - 62,443	36,260
Overall	9	145 - 62,433	9461

**TABLE 5-2**  
**COMPARISON OF UPPER-BOUND CONCENTRATION OF**  
**CHEMICALS IN SEDIMENT WITH AVAILABLE SEDIMENT QUALITY CRITERIA**

Compound <sup>a</sup>	Upper-Bound Measured Concentration in Sediment (µg/kg DW) <sup>b</sup>	Mean Federal Sediment Quality Criteria (µg/kg) <sup>c</sup>	Eliminated as a Chemical of Potential Concern?
Acenaphthene	2148	130,000	Yes
Heptachlor	49.4	3.8	No
Fluoranthene	3681	620,000	Yes
Phenanthrene	4499	180,000	Yes

- <sup>a</sup> Only those chemicals for which federal SQC were available are included in this table.
- <sup>b</sup> Upper-bound (95 percent upper confidence limit) and mean concentrations are based on sediment samples collected near the CWMCS pier only (n = 28). Concentrations are in micrograms per kilogram dry weight. Upper-bound concentrations are reported in Table 2-3.
- <sup>c</sup> Micrograms per kilogram organic carbon.

**TABLE 5-3**  
**COMPARISON OF ESTIMATED PORE WATER CONCENTRATIONS AND AMBIENT WATER QUALITY CRITERIA FOR METALS AND ORGANICS OF POTENTIAL CONCERN IN SEDIMENT**

Chemical	Estimated Upper-Bound Pore Water Concentration (µg/L) <sup>a</sup>	Federal Ambient Water Quality Criteria (µg/L)	Illinois Ambient Water Quality Criteria (µg/L)	Eliminated as a COPC?
<b>METALS</b>				
Antimony	199	1600	NA <sup>b</sup>	Yes
Arsenic	123	440	190 °	Yes
Beryllium	1.5	5.3	NA	Yes
Chromium	68	8852 <sup>ad</sup>	338 <sup>ad</sup>	Yes
Lead	345	353 °	NA	Yes
Mercury	23	0.002	NA	No
Silver	31	11.2 °	5.0	No
Zinc	7233	525 °	1000	No
<b>ORGANICS<sup>c</sup></b>				
Diethyl phthalate	1811	3 <sup>f</sup>	NA	No
Heptachlor	0.14	0.05	NA	No
Methylene chloride	457	NA	1.4	No
Phenanthrene	11	NA	3.7	No

<sup>a</sup> Upper-bound (95 percent upper confidence limit) and mean concentrations are based on samples taken from near the CWMCS facility only (n = 28) assuming that non-detect values were equal to one-half the SQL. Pore water concentrations were derived in Section 3.4.1 and Table 3-5 for organics and Table 3-6 for metals.

<sup>b</sup> AWQC are not available for that chemical.

<sup>c</sup> Derived using the mean facility-specific hardness value of 182 mg CaCO<sub>3</sub>/L.

<sup>d</sup> Value is for trivalent chromium.

<sup>e</sup> Only those organics for which state or federal AWQC are available were included.

<sup>f</sup> Value is for phthalate esters.

**TABLE 5-4**  
**SUMMARY OF THE TOXICOLOGICAL DATA**  
**FOR BOTTOM DWELLING ORGANISMS AND PREDICTED**  
**TOXICITY REFERENCE VALUES (MATCs) FOR ORGANIC CHEMICALS**  
**OF POTENTIAL CONCERN IN SEDIMENT**

Chemical	Number of LC <sub>50</sub> Values Available	Minimum and Maximum MATCs (µg/L)	Arithmetic Mean MATC (µg/L) <sup>a</sup>
PAHs	10	48.5 - 725 <sup>b</sup>	212
1,2-trans-Dichloroethylene	2	9538 <sup>b</sup> - 43,098 <sup>c</sup>	26,318
Phenol	2	1019 - 1976 <sup>c</sup>	1498
Heptachlor	1	0.5 <sup>b</sup>	---
Phthalate esters <sup>d</sup>	3	157 <sup>b</sup> - 1380 <sup>c</sup>	679
Methylene chloride	3	13,981 - 23,214 <sup>e,e</sup>	17,760

- <sup>a</sup> Since the range of LC<sub>50</sub> data could be for either vertebrates (ictalurids) or invertebrates, MATCs were calculated for each individual LC<sub>50</sub> value using either Equation 5-4 or 5-5 as appropriate before the mean MATC was derived.
- <sup>b</sup> Calculated using Equation 5-3 for invertebrates.
- <sup>c</sup> Calculated using Equation 5-2 for vertebrates.
- <sup>d</sup> Used to derive toxicity quotients for diethyl phthalate.
- <sup>e</sup> Based on data for pelagic species, since toxicological data for benthic invertebrates and ictalurids were not available.

**TABLE 5-5**  
**SUMMARY OF THE TOXICOLOGICAL DATA**  
**FOR BOTTOM DWELLING ORGANISMS AND PREDICTED TOXICITY REFERENCE**  
**VALUES (MATCS) FOR THE METALS OF POTENTIAL CONCERN**

Chemical	Number of LC <sub>50</sub> Values Available	Range of MATCs (µg/L)	Arithmetic Mean MATC (µg/L)
<b>Mercury</b>			
Ictalurids	1	23.5	---
Benthic invertebrates	6	6.1 - 193	84.9
Overall	7	6.1 - 193	76.1
<b>Silver</b>			
Ictalurids	0	---	---
Benthic invertebrates <sup>a</sup>	1	193	---
<b>Zinc</b>			
Ictalurids	1	55	---
Benthic invertebrates	5	38.6 - 6751	2616
Overall	6	38.6 - 6751	2189

- <sup>a</sup> LC<sub>50</sub> of 3200 µg/L for midge (*Tanytarsus dissimilis*) exposed to silver at a hardness of 48 mg CaCO<sub>3</sub>/L (USEPA, 1980b).

**TABLE 5-6**  
**TOXICITY PROFILES FOR THE CHEMICALS OF POTENTIAL CONCERN**

<b>ORGANICS</b>	
Polycyclic Aromatic Hydrocarbons (PAHs)	In general, toxicity of PAHs increases as molecular weight increases. PAHs in sediments generally have limited bioavailability to aquatic organisms. Although high molecular weight PAHs tend to have lower toxicities, this fact may be due to their lower solubility in water. Because the more hydrophobic PAHs, such as benzo(a)pyrene, have a high affinity for binding to organic matter and have relatively high biotransformation rates may lessen or negate the bioaccumulation of lipophilic PAHs. The ability to metabolize and eliminate PAHs varied by species. In bluegills, 89% of benzo(a)pyrene taken up was lost 4 hours after exposure. In general fish tend to rapidly metabolize PAHs (Eisler, 1987a). PAHs have been identified as genotoxic compounds (i.e., are ability to alter cellular DNA), and increasing body burdens of PAHs in fish has been correlated with increasing incidence of liver tumors (Eisler, 1987a). Other noncarcinogenic effects elicited by exposure to some PAHs include decreased reproduction, decreased respiration and heart rate, abnormal blood chemistry, and enlarged livers. Large interspecific differences in the ability to absorb and assimilate PAHs have been reported in the literature (Eisler, 1987a). Crustaceans and fish tend to readily absorb PAHs, while molluscs and annelids do not.
Heptachlor	Heptachlor is a broad spectrum insecticide. $LC_{50}/EC_{50}$ values for heptachlor range from 1 to 320 $\mu\text{g/L}$ in various freshwater vertebrate and invertebrate species (USEPA, 1980d).
1,2-trans-Dichloroethylene	Limited toxicity data on dichloroethylenes are available. Chronic exposure to 2.8 mg/L 1,1-dichloroethylene did not cause adverse effects in fathead minnow (USEPA, 1986b).
Diethyl phthalate	In general, phthalate esters are insoluble in water and have a low volatility. Some evidence suggests that fish can rapidly metabolize phthalate esters (USEPA, 1981a). A high metabolism and clearance rate would reduce the toxicity of these compounds unless more toxic residual metabolites were produced. Chronic exposure to phthalate esters can diminish reproductive success and increase sac fry mortality, although no effect on egg hatchability or mortality was reported (USEPA 1981a).
Methylene chloride	Chronic exposure caused gill damage in fathead minnow. Acute 96-hour $LC_{50}$ s range from 193,000 to 310,000 $\mu\text{g/L}$ (Etnier <i>et al.</i> , 1986).
Phenol	Temperature is the factor most frequently tested for its effects on the toxicity of phenol. For fathead minnows, 96-hour $LC_{50}$ s decreased as water temperature increased from 15° to 25° C. In bioassays with brook trout and freshwater worms, overall resistance increased with decreasing temperatures. Thus, the effects of temperature on phenol toxicity appears to be species-specific. Acclimation may also affect the toxicity of phenol. Guppies that had been raised in low concentrations of phenol for three generations were five times as resistant to phenol as unacclimated fish (USEPA, 1981b). chronic exposure can cause decreased reproductive rate, increased molting rate, loss of balance, embryo deformations, delayed hatching, decreased feeding rate, and damage to internal organs, while prolonged exposure could cause mortality (USEPA, 1981b).
Toluene	Chronic exposure caused teratogenesis and embryonic abnormalities, decreased oxygen consumption, and other abnormal physiological changes (Etnier <i>et al.</i> , 1986).

**TABLE 5-6**  
**TOXICITY PROFILES FOR THE CHEMICALS OF POTENTIAL CONCERN**  
 - Continued -

<b>METALS</b>	<p>Scientific investigations have determined that several factors affect the actual toxicity of metals, including acclimation of the aquatic species, speciation of the metals of concern, water hardness, and the frequency of occurrence of toxic conditions. An organism's tolerance to environmental stressors is greatly affected by the environmental conditions previously experienced (e.g., prior exposure to the toxic materials present) (Chapman, 1985). Acclimation of fish populations resulting in increased tolerance to elevated concentrations of zinc (i.e., to zinc concentrations exceeding AWQC) has been documented in the literature (Spehar <i>et al.</i>, 1978; Chapman, 1978, 1985; Sinley <i>et al.</i>, 1974; Rahel, 1981).</p> <p>Metal speciation and bioavailability are also important in determining the toxicity of metals to aquatic organisms. It is widely accepted that metals have highly variable toxicity due to their interactions with other materials present in the water (Chapman, 1985). The presence of metals species of low toxicity, which result from the formation of metal complexes, can account for the diminution of metals toxicity in natural waters (Chapman, 1985). High concentrations of some metals can be tolerated by aquatic organisms if the metals are bound or complexed in the water. Factors affecting metal speciation and form include pH, hardness, alkalinity, suspended solid content, the presence of organic and inorganic ligands in the water, and oxidation reduction potential.</p>
Mercury	<p>Signs of acute mercury poisoning in fish include respiratory dysfunction, loss of equilibrium, and sluggishness. Chronic effects include emaciation, brain lesions, cataracts, abnormal motor coordination, and an inability to capture food (Eisler, 1987b). Chronic exposures can adversely affect reproduction, growth, behavior, metabolism, blood chemistry, osmoregulation, and oxygen exchange (Eisler, 1987b). BCFs for freshwater species of 4000 to 85000 have been reported for methylmercury. A BCF for freshwater organisms of 4994 has been reported for inorganic mercury. BCFs of 10,000 and 40,000 have been reported for inorganic (mercuric chloride) and methylmercury, respectively. Temperature is one of the most important environmental factors influencing the toxicity of mercury. In an experiment with rainbow trout, when temperature was increased from 5° C to 20° C, the 96-hour LC<sub>50</sub> dropped by 50%. The same effect has been observed in freshwater invertebrates. An antagonistic relationship between methylmercury and copper was observed in a bioassay with blue gourami. In another study, researchers found that selenium seemed to offer a protective effect against the toxic effects of inorganic mercury. Finally, methylmercury is more toxic to aquatic receptors than mercuric chloride (USEPA, 1981c).</p>
Silver	<p>Sublethal exposures to silver may cause reduction in spawning behavior or other reproductive effects, premature hatching, reduce fry growth, and retarded growth (USEPA, 1981d). Parameters that influence the toxicity of silver to aquatic receptors include water hardness, temperature, dissolved oxygen concentration, pH, form of the silver present in the aquatic environment, other solids present, and fish size and species. Silver toxicity tends to decrease with increasing hardness. The effects of silver are likely to be greater in pure water than in water that contain appreciable amounts of other metal ions. Silver is less toxic in alkaline waters with a pH from 7.5 to 9.5 than in waters with lower pHs. Long-term exposure may increase the resistance of aquatic organisms to silver.</p>



**TABLE 5-6**  
**TOXICITY PROFILES FOR THE CHEMICALS OF POTENTIAL CONCERN**  
**- Continued -**

Zinc	<p>Mortality from zinc exposure is generally from gill destruction and hypoxia. Sublethal doses of zinc to freshwater fish have caused edema, blood changes, and liver necrosis. Copper and iron deficiencies may occur from exposure to high levels of zinc. Cadmium seems to mitigate the toxic effects of zinc. In the presence of high concentrations of hydroxide or carbonate anions (usually in hard waters or waters with a high pH), or in a reducing environment zinc precipitates. An inverse relationship between pH and toxicity of zinc was observed for fathead minnows. High pH values corresponded to low LC<sub>50</sub>s. An inverse relationship was observed between dissolved oxygen levels and zinc toxicity in bluegill. A dissolved oxygen levels increased from 1.8 to 5.6 mg/L, LC<sub>50</sub> values also increased (USEPA, 1981e).</p> <p>Like copper, zinc is an essential nutrient required in the metabolism of most organisms but is not as toxic at low concentrations as copper. The potential toxicity is influenced by calcium and magnesium levels in water as well as water hardness and pH. Ions that affect water hardness, particularly, calcium and magnesium ions, compete with zinc for uptake and binding sites within biological tissues (EPA, 1980d). Secondly, harder waters contain larger quantities of charged ions in solution that electrostatically inhibit the ability of zinc to approach binding and sorption sites. Thirdly, harder water generally have higher pH and higher alkalinity, which enhances the formation of insoluble zinc complexes (USEPA, 1980c).</p>
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## **6.0 QUALITATIVE UNCERTAINTY ANALYSIS**

Like other forms of mathematical modeling, ecological risk assessment relies on data, estimation methods, and assumptions that have varying degrees of accuracy, validity, and inherent uncertainty. As a result, uncertainty will surround the results of any ecological evaluation. An uncertainty analysis takes into account the inherent variability in measured and estimated parameters, allowing decision makers to evaluate risk estimates in the context of the quality and reliability of the assumptions and data used in the assessment. Principal sources of uncertainty include the environmental sampling data, the toxicological dose-response data, and the effects assessment. In addition, with any ERA, facility-specific uncertainties are likely to arise. The extent to which these sources of uncertainty may over- or underestimate the true exposure (and hence risk) to ecological receptors at the facility is discussed below. Further, even if all areas of uncertainty could be addressed, it would be impossible to distinguish individual sources that have contributed to the potential ecological impacts on Lake Calumet.

### **6.1 Uncertainty Associated with Determining the Nature and Extent of Potential Contamination**

Uncertainties involved in measuring chemical concentrations in environmental media can be substantial. Major sources of uncertainty in environmental sampling and analysis include handling procedures; sampling location, number, and density; analyte extraction; sample dilution; analytical detection limits and handling of non-detects; analytical interference; and instrument limitations. Even with strict quality assurance and control measures, there is no assurance that the environmental samples taken are fully representative of the facility. These uncertainties are expected to have low to moderate potential to over- or underestimate risk.

A major source of uncertainty in the aquatic evaluation stems from the fact that the measured concentration of COPCs in surface water and sediment samples taken near the facility are assumed to originate solely from the facility. Since other sources have contributed to the levels

of COPCs measured near the facility, use of these data will overestimate the true risk to aquatic receptors solely attributable to potential releases from the facility. The degree to which risks are overestimated cannot be quantified, however, since it is impossible to determine other sources' contributions.

## **6.2 Uncertainty Associated with the Selection of Key Receptor Species**

The criteria used to select key receptor species were designed to ensure protection of all species present at the facility by including not only maximally exposed but also sensitive species. For example, both vertebrate and invertebrate species as well as pelagic and benthic organisms were considered. In addition, toxicological data for salmonids and *Daphnia sp.*, which are typically more sensitive to chemical exposure than other species, were used to derive TRVs for pelagic organisms.

## **6.3 Uncertainty Associated with the Exposure Assessment**

The exposure assessment includes a number of major sources of uncertainty, including exposure point concentration estimation, bioavailability of contaminants, and the distribution of the receptors and stressors. Because this assessment is deterministic (i.e., parameters are estimated as single values rather than distributions), uncertainty cannot be described quantitatively. The following discussion therefore focuses on (1) identification of sources of uncertainty in exposure estimation, and (2) their qualitative or relative importance in interpretation of results.

The primary objective of this assessment was to arrive at an exposure estimate that would be located within the high end of the actual probabilistic exposure distribution. Exposure point concentrations were defined as the upper 95% confidence limit on the mean or the maximum measured value, whichever was less. For biota, this approach implies that an organism spends its life in near contact with upper-bound concentrations of all COPCs simultaneously. This assumption is likely to overestimate risks, since (1) many receptors do not stay in one area for long, and (2) upper-bound concentrations of COPCs are not geographically coincident. For

example, maximum levels of antimony and arsenic in sediment were measured at sampling locations S-29 and S-24, respectively. Hence, the assumption that both sessile and mobile aquatic organisms are continuously exposed to the upper-bound concentration of all COPCs in sediments simultaneously is improbable. Mobile species are likely to forage over a relatively large area, while sessile organisms are not likely to inhabit areas where upper-bound levels of all COPCs occur simultaneously.

### 6.3.1 Determining Exposure Point Concentrations for Sediments

The bioavailability of metals is well known to be decreased by association with sediments, including those in Lake Calumet. Because of this interaction with sediment particles, only a fraction of the metals ingested is actually available to be absorbed (and, therefore, exert toxic effects). The bioavailability and toxicity of metals vary with the physical and chemical form of the metal. Metals sorbed to particulates or those that exist in a complexed form are generally less bioavailable than metals in the dissolved form. The dissolved fraction best represents the bioavailable (and therefore potentially toxic) concentration of metals to aquatic life (Adams *et al.*, 1992). The lack of correction of exposure to account for the reduced bioavailability of sediment-associated metals in this assessment tends to overestimate exposure and risk estimates.

### 6.3.2 Estimating Pore Water Concentrations

DiToro *et al.* (1991) reported that the concentration-response curve for the biological effect of concern was better correlated to interstitial (pore) water concentration than the total concentration of chemicals in sediments if sediment concentrations are normalized for organic carbon. The equilibrium partitioning approach was used to estimate the concentration of COPCs in pore water based on their measured concentration in sediment. Equilibrium partitioning assumes that an equilibrium exists between the organic carbon within the sediment and pore water. The primary advantage of the equilibrium partitioning approach is that it allows for the rapid evaluation of sediments, which does to some extent account for differences in bioavailability of nonionic organics sorbed to sediments (Adams *et al.*, 1992). Conversely, the

following assumptions are inherent to the equilibrium approach: (1) the partitioning of nonionic organic chemicals can be predicted largely on the basis of organic content of the sediments, with little dependence on any chemical or physical factors; (2) the potential for toxicological effects is better correlated to the concentration of dissolved substances in pore water than to the complexed or sorbed concentration measured in sediments; and (3) steady-state exists between the solid and aqueous phases (Chapman, 1989).

One disadvantage of this approach is that it assumes that the primary route of exposure to sediments is uptake of contaminants in pore water across the gill membrane and that direct ingestion of sediments is negligible. If sediment and pore water are at steady-state, the exposure concentration is the same regardless of the exposure route. Secondly, it is important to emphasize that the reliability of estimated pore water concentrations is directly related to the reliability of the sediment partitioning coefficients used ( $K_{oc}$  values for organics and  $K_d$  values for metals). For most organic chemicals, the available  $K_{oc}$  data are highly variable and can vary by as much as two orders of magnitude in some extreme cases (DiToro *et al.*, 1991). Similarly, a large source of uncertainty associated with estimating pore water concentrations can be attributed to the error in calculated sediment to water partitioning coefficients ( $K_d$  values).  $K_d$  values are highly dependent upon sediment type. Table 2-7 shows that the observed range of  $K_d$  values can vary by as much as five orders of magnitude. A third disadvantage of the pore water approach is that there is no guarantee that the equilibrium partitioning assumption is valid for all non-ionic organic contaminants (DiToro *et al.*, 1992).

### 6.3.3 Exposure Estimation for Aquatic Receptors

Dose-based estimates for aquatic organisms were not calculated for the ecological risk assessment. Instead, an approach that relies on the uptake of contaminants across the gill membrane was adopted. This widely-accepted approach is expected to account for the major pathway of exposure by aquatic organisms. It is possible that other pathways of exposure, such

as ingestion of contaminated sediment or prey, could also contribute substantially to overall exposure. Theoretically, if a dynamic equilibrium between sediment and pore water are assumed, then direct exposure to pore water via the gills adequately reflects exposures from direct sediment ingestion. Hence, the exclusion of sediment ingestion is expected to have a low impact on risk estimates. Exposures due to direct ingestion of prey are not readily quantifiable, however, since (1) data on the concentration of contaminants in fish are not available; (2) data on the quantity and types of fish consumed are not available for all species, and (3) the fraction of prey consumed from the area near the pier is difficult to quantify. Thus, while ingestion of prey may add to the overall toxicity of aquatic organisms inhabiting areas near the facility, the contribution to overall risk cannot be determined.

#### **6.4 Uncertainty Associated with the Effects Assessment**

There is considerable uncertainty associated with the calculation and interpretation of TQs for all receptor groups evaluated in this ERA. The primary source of uncertainty in calculating TQs for aquatic receptors is the derivation of toxicity reference values (TRVs). Chronic maximum allowable toxicant concentration (MATCs) were estimated from  $LC_{50}$  data using Suter *et al.*'s (1987) and Suter's (1986) regression models. Use of the MATC as the chronic endpoint is conservative, since it is defined as the effects threshold at or below which adverse chronic effects are not expected to occur (Suter, 1992). Thus, it is possible that concentrations above the MATC level could be tolerated without significant population-level effects. The exact concentration that would not be expected to cause population-level effects cannot be precisely calculated; however, the definition of an MATC suggests that TQs greater than or equal to 1 do not necessarily imply the occurrence of adverse effects in exposed populations. On the other hand, as with any predictive regression equation, the calculated MATC could be higher or lower than the true value. Therefore, the resulting TQs could under- or overestimate the potential that aquatic organisms might experience adverse effects. The degree to which the TQ may under- or overestimate such effects, however, cannot be quantified. On the other hand, the lowest TRV reported for any benthic receptor was used to calculate TQs for all benthic receptors. Hence, any tendency of the Suter *et al.* (1987) and Suter (1986) equations to underestimate MATCs is

offset by the conservative approach of using the minimum TRV to calculate TQs.

Although TQs less than 1 generally indicate that adverse effects are not probable, there is no regulatory guideline for an acceptable ecological TQ level. For adequate protection of aquatic receptors, knowledge of exposures typically encountered by key receptor organisms collectively is of greater value than estimates of upper-bound exposures potentially affecting a few organisms. A particularly difficult area of interpretation is when TQs are only slightly higher or lower than one. In these cases, other relevant information, such as field data and the estimated uncertainty bounds on the dose and toxicity values, need to be considered before final conclusions concerning potential adverse effects can be made. The aquatic species diversity and their abundance in Lake Calumet argue against any population level effects. A comparison of current species diversity with historical records shows a relative reduction in species diversity over time. IDENR (1988) reports that the current fish community in Lake Calumet, however, remains diverse. A score of 48 was calculated for Lake Calumet based on Karr's Index of Integrity (Karr, 1981), which is used to evaluate the quality of fish fauna. This score is comparable to scores obtained for the Fox River and falls within the "good" range (Greenfield and Rogner, 1984).

#### **6.4.1 Uncertainty Associated with Evaluating the Toxicity of Metals in Sediments**

Sediments exhibit varying degrees of toxicity for the same total amount of metal present. These differences largely pertain to the bioavailability of various metals in sediments. The bioavailability of metals in sediments is correlated with the chemical activity of the metal in the sediment/interstitial water system. Sediment properties that influence metal activity in sediments also determine the fraction of the metal that is bioavailable and, therefore, potentially toxic (DiToro *et al.*, 1992). The toxicity of metals in sediments has been strongly correlated with the sulfide and metal concentrations extracted from the sediment using hydrochloric acid. The sulfide fraction is generally referred to as the acid volatile sulfide (AVS). If the concentration of metal extracted from the sediments is less than the AVS concentration, then no acute toxicity is expected.

Calculations have been undertaken to compare metal concentrations in sediment to existing sediment and water quality standards. Potential impacts are identified. Similar calculations using background concentrations obtained from clay samples would yield similar results. Analytical data obtained during the facility investigation indicates the calculated impacts are conservative.

#### **6.4.2 Other Factors Affecting Metals Toxicity to Aquatic Receptors**

Scientific investigations have determined that several factors may affect the actual toxicity of metals. Such factors include (but may not be limited to) the sensitivity of the species present in Lake Calumet, the metals' speciation status, evolutionary or acquired tolerance, antagonism among the metals, water hardness, the frequency of occurrence of toxic conditions, and competitive binding of divalent metal cations to acid volatile sulfide (AVS) in sediments. Conversely, other factors could increase the toxicity of metals. For example, exposure to a mixture of COPCs by key receptors could increase the toxicity of individual metals synergistically.

##### **6.4.2.1 *Acclimation and Tolerance***

Tolerance can be achieved by physiological acclimation during low levels of exposure and/or by genetically based mechanisms. Physiological tolerance is not inherited, and such individuals lose their tolerance when transferred to unpolluted environments, while genetic tolerance is inherited by offspring regardless of whether they are reared in polluted or nonpolluted environments (Mulvey and Diamond, 1991). An organism's tolerance to environmental stressors is greatly affected by the environmental conditions previously experienced, i.e., prior exposure to the stressors (Chapman, 1985). Acclimation of fish populations resulting in increased tolerance to concentrations of zinc exceeding AWQC has been documented in the literature (Spehar, 1978; Chapman, 1978, 1985; Sinley *et al.*, 1974; Rahel, 1981). Melancon and Miller (1984) conducted in-situ bioassays at Prickly Pear Creek, Montana, and reported decreased mortality in resident brook trout and hatchery brook trout exposed to effluent spiked with zinc



and copper that were allowed to acclimate 7 to 10 days in the creek. Chapman (1985) reported 90 percent of early life stage chinook salmon previously acclimated to 0.51 mg/L zinc for five months survived a 96-hr exposure to 1.4 mg/L zinc (the  $LC_{50}$ ). Similar acclimation to elevated zinc concentrations was reported by Sinley *et al.* (1974). In a 21-month test, rainbow trout exhibited up to a four-fold increase in their tolerance to zinc when exposed as eggs to concentrations of zinc ranging from 0.01 to 0.55 mg/L. Spehar (1976) reported that adult flagfish (Cyprinodontidae, Jordanella floridae) showed a three-fold increase in tolerance to zinc when exposed as eggs and fry. These results demonstrate that acclimation to zinc during early life stages can result in an increased tolerance to zinc by some species. The fact that fish species inhabiting Lake Calumet have been exposed to zinc levels above AWQC levels during early life stages suggest that these populations may have acclimated to the relatively consistent (long-term) presence of elevated levels of zinc. Since the potential for acclimation by resident fish was not directly evaluated, the degree to which acclimation may ameliorate the toxicity of metals in Lake Calumet cannot be determined. Furthermore, while the studies cited herein were not conducted using fish species that are known or suspected to occur in Lake Calumet, they do indicate that acclimation by some species can increase resistance to the toxicity of some metals.

Elevated metals concentrations have existed in Lake Calumet at varying intensities for many years. Populations of aquatic organisms have continued to exist and reproduce within Lake Calumet throughout these years and have been subjected continually to these conditions and, as a result may have acquired a certain level of tolerance. Tolerance can be broadly defined as "the ability of an organism to cope with the stress associated with exposure to metal concentrations that are inhibitory or lethal to nontolerant individuals" (Mulvey and Diamond, 1991). If fish in Lake Calumet have developed tolerance (acquired or inherited), then the TRVs used in this assessment will lead to overestimation of risk.

#### 6.4.2.2 Metals Speciation

Metal speciation and bioavailability are also important in determining the toxicity of metals to aquatic organisms. It is widely accepted that metals have highly variable toxicity due to their

interactions with other materials present in the water (Chapman, 1985). The formation of less toxic metal complexes can account for the diminution of metals toxicity in natural waters (Chapman, 1985). High concentrations of some metals can be tolerated by aquatic organisms if the metals are bound or complexed to particulates in the water. Factors affecting metal speciation and chemical form include pH, hardness, alkalinity, suspended solids content, the presence of organic and inorganic ligands in the water, and oxidation reduction potential. For example, at a pH of 6.0, zinc exists as free ion (98%) and as zinc sulfate (2%), while at a pH of 9.0, zinc occurs as a monohydroxide ion (78%), as zinc carbonate (16%), and as free ion (6%) (USEPA, 1987). Generally, waters with higher alkalinities tend to result in the formation of insoluble zinc carbonate and hydroxide compounds that are not readily absorbed by most aquatic species (USEPA, 1987). Furthermore, Allen *et al.* (1980) reported that the toxicity of zinc was not related to total metal concentration but to the predicted free metal concentration. The degree to which this phenomenon may influence metals toxicity cannot be determined for the facility.

#### 6.4.2.3 *Effects of Exposure to Mixtures of Metals*

The cumulative effects of simultaneous exposure to multiple metals by terrestrial and aquatic receptors was evaluated, since it is possible that the cumulative effects of simultaneous exposure to multiple metals may result in the mixture being more toxic than exposure to a single metal. Cadmium tends to act antagonistically with zinc in many animals (both terrestrial and aquatic), while lead tends to act synergistically with cadmium and zinc. For example, Weis and Weis (1991) found that the presence of zinc increased the viable hatch of herring eggs in systems with 5.0 mg/L cadmium.

TQs presented in Tables 7-1 and 7-2 do not reflect the possible synergistic or antagonistic relationship for cadmium, zinc, and lead. If the effects of cadmium and lead and lead and zinc are assumed to be additive, the cumulative upper-bound TQ for the aquatic organisms would still be well above 1. Similarly, if cadmium and zinc do act antagonistically, TQs for the aquatic receptors would remain well above 1, since the individual TQs for cadmium (7) and zinc (5)

would be added together. Thus, the possibility that the metals of concern in sediments may behave antagonistically or synergistically is not expected to have a large impact on risk estimates, since individual TQs calculated for most metals exceed 1.

## **6.5 Potential Impacts to the Species**

Thirteen bird species (black-crowned night heron, common moorhen, yellow-headed blackbird, pied-billed grebe, upland sandpiper, Wilson's phalarope, black tern, great egret, least bittern, American bittern, yellow rail, red-shouldered hawk, and northern harrier) are listed by the State of Illinois as threatened or endangered, while six plant species are classified as threatened or endangered (marsh-speedwell, awned sedge, little green sedge, fewflower spike rush, Richardson rush, and small white lady's slipper). Since no T&E species are known to occur at the facility, these species are not expected to experience adverse effects from potential exposure to contaminants. Given the historical uses of the facility, the lack of native soils throughout the pier, and the inherent competitiveness of the weedy/invader-type species that have colonized the pier, these six T&E plant species have a decreased potential of occurrence at the facility. Similarly, T&E bird species are not expected to be exposed to contaminants since most species do not overwinter in the area and most species forage over a large area relative to the area of the facility.

Two threatened fish species, the banded killifish and the Iowa darter, have the potential to occur in Lake Calumet region. Since the sensitivity of these species to the contaminants of concern is not well characterized and since neither species was reported to occur in Lake Calumet (IDENR, 1988), these species are not expected to experience potential adverse impacts.

## 7.0 RISK CHARACTERIZATION

Risk characterization involves estimating the magnitude of potential ecological risks and the nature of potential adverse impacts to ecological receptors. This section evaluates potential adverse effects to key aquatic species associated with exposure to COPCs in surface water and sediments. Risks were assessed by comparing the measured or estimated concentration data with state and federal water quality criteria and chronic toxicity values (chronic MATCs) as described in Section 5.0 (i.e., application of the TQ approach).

Before discussing the specific TQ results, the criteria used to evaluate TQs is defined and an explanation of how the TQ results were interpreted is provided. TQ results were evaluated using these criteria: (1) TQs less than 1 represent no impact to exposed individuals or populations, and (2) TQs greater than or equal to 1 indicate that adverse chronic impacts are possible. A TQ greater than 1 indicates that the measured concentration exceeds a concentration that caused some impact in a certain test species under a given set of experimental conditions. In this sense, TQs greater than 1 can be used to indicate that chronic adverse impacts to exposed individuals are possible. Given that the goal of this ERA is to evaluate potential adverse effects on exposed populations, a TQ of 1 may be overly conservative. Within a given ecosystem, loss of some individuals in a receptor group is acceptable if the entire population will not be adversely impacted. Barnthouse and Suter (1986) state that "ecological risk assessments used in decision making should be based, to the greatest extent possible, on objective estimates of ecological damage (e.g., probabilities of population extinction or reductions in abundance of plants and animals)." Hence, a TQ greater than 1 does not necessarily mean that effects observed in the laboratory are likely to occur in the field or that exposures in the field are significant enough to cause population-level effects. Furthermore, there is not a linear (one-to-one) relationship between increasing TQ values and the probability of adverse effects. For example, a TQ of 2 does not imply that adverse effects are twice as likely to occur in a given ecologic system as a TQ of 1. The intent of a TQ approach is to provide a continuous quantitative scale so that

evaluation and rank ordering of potential impacts can be assessed. Generally, the likelihood that some organism will be adversely affected increases as TQs increase.

The TQ approach was used to evaluate the potential for adverse effects to receptors within the same ecologic group. As stated in Section 3.0, selection of key receptor species was designed to minimize the possibility that other species might be more exposed than the selected key species. Ecosystem effects are evaluated by analyzing potential impacts to various trophic levels, with field assessment serving as the "reality check" on the paper studies. The inclusion of benthic invertebrates and higher-level pelagic consumers in this analysis provides sufficient data to assess the general condition of all trophic levels. Thus, by using toxicological data for the key receptor species selected for this facility, it is appropriate to conclude whether other species within the same ecological group are unlikely to be adversely affected.

#### **7.1 TQ Results for Chemicals of Potential Concern in Sediment**

Toxicity reference values (MATCs) summarized in Tables 5-4 and 5-5 for organic chemicals and metals of potential concern, respectively, were combined with the estimated concentration of chemicals in pore water to evaluate the potential toxicity of sediment COPCs. In this evaluation, however, a distinction was made between sessile benthic organisms, or those that can potentially remain in the same area for extended periods of times, and mobile organisms. Potential adverse effects from exposure to COPCs in sediments near the CWMCS facility by mobile and sessile benthic organisms were evaluated using the following approach.

1. The upper-bound concentration of each COPC in pore water was compared to its lowest TRV listed in Tables 5-4 and 5-5. If the resulting TQs were less than 1 (i.e., the upper-bound pore water concentration is less than the minimum TRV), then adverse effects from exposure to that chemical in sediment by mobile and sessile organisms are not expected, and no further evaluation of that chemical was required.
2. For those chemicals whose TQs (based on the minimum TRV) were equal to or greater than 1, the mean concentration of chemical in pore water was compared to its minimum TRV. If TQs based on the mean pore water concentration were less

than 1, then adverse effects from exposure to that chemical by mobile benthic organisms are not expected.

The use of the lowest TRV listed in Tables 5-4 and 5-5 for each COPC was conservatively assumed to adequately account for the varying toxicities of the chemicals detected in Lake Calumet sediments, as well as the different bottom dwelling species known or suspected to inhabit sediments near the CWMCS facility. Upper-bound concentration data were used to evaluate potential effects to sessile benthic organism, since these organisms can remain in place for long periods of time. Conversely, mean concentration data were assumed to better reflect the temporal and spatial variations to which mobile aquatic species may potentially be exposed. Hence, adverse population-level effects were not considered probable for mobile benthic organisms unless the arithmetic mean pore water concentration exceeded the lowest referenced TRV. Conversely, population-level adverse effects for sessile benthic organisms were considered possible if the upper-bound pore water concentration exceed the minimum TRV.

TQ results for sediment COPCs using the lowest reported TRVs and the estimated upper-bound (95 percent upper confidence limit) and mean concentrations of chemicals in pore water near the pier only (i.e., Lake Calumet sediment samples were not included) are presented in Table 7-1. Mean TQs (i.e., the TQ based on the mean pore water concentration) were calculated only if the upper-bound TQ equaled or exceeded one. These data show that TQs based on the upper-bound pore water concentration and the minimum TRV were less than 1 for all organic and metals of concern, with the exceptions of mercury, zinc, diethyl phthalate, naphthalene, and phenol (upper-bound TQs range from 1 for naphthalene to 187 for zinc). These results suggest that mobile and sessile benthic organisms are not expected to experience adverse effects from exposure to silver, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(ghi)perylene, chrysene, 1,2-trans-dichloroethylene, fluoranthene, heptachlor, indeno(1,2,3-cd)pyrene, methylene chloride, and pyrene. Table 7-1 shows that TQs exceeded unity even when the mean pore water concentrations were used for mercury, zinc, diethyl phthalate, and phenol (mean TQs range from 2 for mercury and phenol to 161 for zinc). Hence, exposure to these four chemicals present in Lake Calumet sediments near the facility

could potentially pose adverse effects to sessile and mobile benthic organisms. Exposure to naphthalene could potentially cause adverse effects in exposed sessile benthic organisms. A rank order of TQs indicates that adverse effects are more likely from exposure to zinc than the other sediment COPCs. Chemicals whose TQs equal or exceed 1 when minimum TRVs were used are summarized in Table 7-2.

For those chemicals whose TQs based on the minimum TRV listed in Tables 5-4 and 5-5 were equal to or greater than 1, the upper-bound and mean concentration of each COPC in pore water was compared to its mean TRV listed in Tables 5-4 and 5-5. To provide a less conservative portrayal of the potential toxicity of sediments to aquatic organisms, TQs were calculated using the arithmetic mean TRVs (MATCs) listed in Tables 5-4 and 5-5. Use of the minimum TRV may overestimate the true risk to aquatic receptors, since this approach assumes that all species inhabiting Lake Calumet are equally as sensitive to a given chemical as the most sensitive organism tested. Use of the arithmetic mean TRV may better reflect the varying susceptibilities of the myriad of aquatic organisms that may be exposed to facility-related COPCs. Table 7-3 compares upper-bound and mean pore water concentrations with the mean TRV for those four chemicals whose TQ, based on the minimum TRV, exceeded 1. These data show that TQs based on mean TRVs were less than 1 for mercury and naphthalene, which indicates that mobile and sessile benthic organisms are not expected to experience adverse effects from exposure to these chemicals in Lake Calumet sediments near the CWMCS pier. Conversely, TQs based on mean TRV exceeded unity for diethyl phthalate, phenol, and zinc (TQs ranged from 2 for phenol to 3 for zinc and diethyl phthalate). Hence, adverse effects from exposure to these three chemicals by mobile and sessile benthic organisms are possible. Chemicals whose TQs equal or exceed 1 when mean TRVs were used are summarized in Table 7-4.

## **7.2 TQ Results for Chemicals of Potential Concern in Surface Water**

The minimum TRV for toluene listed in Table 5-1 was used to evaluate the potential toxicity of toluene in surface water using the same approach implemented for sediment COPCs. As was

done for sediments, adverse effects for mobile and sessile pelagic organisms were not considered probable if the upper-bound concentration of toluene in surface water did not exceed the minimum TRV. Table 7-5 shows that the upper-bound TQ for toluene was less than 1, which indicates that sessile and mobile pelagic organisms are not expected to experience adverse effects from exposure to toluene in surface water.

### 7.3 TQ Results for Metals of Potential Concern in Clay

### NEW SECTION

Since the metals of concern are naturally occurring, it is necessary to account for the fact that the measured level of metals in environmental media may not be attributable to releases from the facility. Clay samples collected from the facility during the Phase II investigations were used to determine if measured levels of metals in sediments samples taken near the CWMCS pier were elevated relative to naturally-occurring baseline levels. Clay samples represent baseline conditions prior to human activities either on the facility or in the vicinity of the property. Furthermore, since the pier is built on land that was reclaimed from Lake Calumet, the clay samples used to represent baseline conditions are virtually identical to the clay that underlies existing Lake Calumet sediments. The analytical results show that contamination from historical waste treatment activities has not migrated vertically (downward) in the clay. Thus, the preponderance of metals throughout the clay and the fact that similar levels were measured at the different depths indicate that measured levels represent naturally-occurring concentrations.

The potential toxicity of naturally-occurring metals levels in clay was evaluated using the same approach as was used for assessing Lake Calumet sediments described in Section 7.1.

1. The sediment-to-water partitioning coefficients ( $K_p$  values) presented in Table 3-6 were used to estimate the upper-bound and mean concentrations of metals in clay pore water.
2. The upper-bound measured concentration of metals in clay pore water was compared to national and state chronic AWQC for protection of aquatic life. If the upper-bound concentration did not exceed state and federal AWQC, adverse effects from exposure



to that metal by aquatic organisms were not expected, and no further evaluation was required.

3. For those metals whose upper-bound pore water concentration exceeded AWQC, or those chemicals for which AWQC were not available, toxicity quotients (TQs) were calculated as described in Section 5.2.

Clay pore water concentrations for the metals of potential concern are shown in Table 7-6. Table 7-7 shows that the upper-bound concentrations of antimony, arsenic, beryllium, chromium, lead, and nickel in clay pore water do not exceed state and federal AWQC. Hence, potential adverse effects from exposure to baseline levels of these metals in clay are not probable. Conversely, it was necessary to calculate TQs for cadmium, copper, mercury, silver, and zinc.

Toxicity reference values (MATCs) for mercury, silver, and zinc are summarized in Table 5-5. MATCs for cadmium and copper are summarized in Tables 7 and 8 of Appendix B. The minimum TRV listed for a given chemical was combined with the estimated upper-bound concentration of metals in pore water (Table 7-8) to evaluate the potential toxicity of baseline levels of cadmium, copper, mercury, silver, and zinc in clay according to the same strategy outlined for sediments in Section 7.1. Tables 7-8 and 7-9 present results of the TQ analysis for these metals in clay pore water. Table 7-8 shows that TQs exceed unity even when mean pore water concentrations were used in combination with minimum TRVs for cadmium, copper, and zinc (mean TQs range from 43 for zinc to 448 for copper). Table 7-9 shows that TQs exceed unity even when mean pore water concentrations were used in combination with mean TRVs for cadmium and copper (mean TQs equal 6 for cadmium and 45 for copper), which indicates that exposure to naturally-occurring levels of these metals in clay may cause adverse effects to exposed sessile and mobile benthic organisms. The results of this analysis indicate that naturally-occurring levels of metals in clay are high enough in and of themselves to potentially pose adverse effects to benthic organisms.

### **7.3 Implications for T&E Species**

Two aquatic organisms are listed by the State of Illinois as endangered: the banded killifish (*Fundulus diaphanus*) and the Iowa darter (*Etheostoma exile*). The killifish is a pelagic organism that skims along the surface in search of prey. It is not known for certain if either fish actually occurs in Lake Calumet. While neither species was reported by IDENR (1988) to occur in Lake Calumet, other species in the same genus (*Fundulus* and *Etheostoma*) have been observed in Lake Calumet in the past.

**TABLE 7-1**  
**TOXICITY QUOTIENTS FOR CHEMICALS OF POTENTIAL CONCERN IN SEDIMENT**  
**USING WORST-CASE (MINIMUM) TOXICITY REFERENCE VALUES**

Chemical	Minimum Toxicity Reference Value (µg/L) <sup>a</sup>	Upper-Bound and (Mean) Concentration in Pore Water Near the CWMCS Pier (µg/L) <sup>b</sup>	Upper-Bound and (Mean) Toxicity Quotients <sup>c</sup>
<b>METALS</b>			
Mercury	6.1	23.1 (11.2)	4 (2)
Silver	193	31.4 (23.7)	0.2
Zinc	38.6	7223 (6231)	187 (161)
<b>ORGANICS</b>			
Anthracene	48.5	3.5 (3.0)	0.07
Benzo(a)anthracene	48.5	0.22 (0.09)	0.005
Benzo(a)pyrene	48.5	0.01 (0.01)	<0.001
Benzo(b)fluoranthene	48.5	0.25 (0.20)	0.005
Benzo(k)fluoranthene	48.5	0.12 (0.10)	0.002
Benzo(ghi)perylene	48.5	0.11 (0.04)	0.002
Chrysene	48.5	0.38 (0.27)	0.008
1,2-trans-dichloroethylene	9538	1.4 (1.0)	<0.001
Diethyl phthalate	157	1811 (1500)	12 (10)
Fluorene	48.5	6.7 (5.6)	0.1
Heptachlor	0.5	0.14 (0.11)	0.3
Indeno(1,2,3-cd)pyrene	48.5	0.07 (0.06)	0.03
Methylene chloride	13,981	457 (35)	0.02
Naphthalene	48.5	46.2 (38.6)	1 (0.8)
Pyrene	48.5	3.1 (2.3)	0.06
Phenol	1019	2873 (2456)	3 (2)

- <sup>a</sup> Minimum Toxicity Reference Values are the lowest value listed in Tables 5-4 and 5-5 for organics and metals of potential concern in sediment, respectively.
- <sup>b</sup> Based on sediment samples taken near the CWMCS pier assuming that non-detect values were equal to one-half the sample quantitation limit. Pore water concentrations are listed in Tables 3-5 and 3-6 for organics and metals, respectively.
- <sup>c</sup> Toxicity Quotient equals sediment pore water concentration divided by the lowest reported toxicity reference value. TQs based on mean pore water data were calculated only if the upper-bound TQ exceeded one. All TQs were rounded to one significant figure.

**TABLE 7-2**  
**SUMMARY OF TQS GREATER THAN OR EQUAL TO ONE**  
**BASED ON THE MINIMUM TOXICITY REFERENCE VALUE**

<b>Chemical</b>	<b>Receptor Group</b>	<b>Upper-Bound and (Mean) TQs Based on the Minimum TRV</b>
Mercury	All benthic organisms	4 (2)
Zinc	All benthic organisms	187 (161)
Diethyl phthalate	All benthic organisms	12 (10)
Naphthalene	Sessile benthic organisms only	1 (0.8)
Phenol	All benthic organisms	3 (2)

**TABLE 7-3**  
**TOXICITY QUOTIENTS FOR CHEMICALS OF POTENTIAL CONCERN IN SEDIMENT**  
**USING MEAN TOXICITY REFERENCE VALUES**

<b>Chemical</b>	<b>Mean Toxicity Reference Value (<math>\mu\text{g/L}</math>)<sup>a</sup></b>	<b>Upper-Bound and (Mean) Concentration in Pore Water Near the CWMCS Pier (<math>\mu\text{g/L}</math>)<sup>b</sup></b>	<b>Upper-Bound and (Mean) Toxicity Quotients<sup>c</sup></b>
Diethyl phthalate	679	1811 (1500)	3 (2)
Phenol	1498	2873 (2456)	2 (2)
Naphthalene	212	46.2 (38.6)	0.2
Mercury	76.1	23.1 (11.2)	0.3
Zinc	2189	7223 (6231)	3 (3)

- <sup>a</sup> Mean Toxicity Reference Values are listed in Tables 5-4 and 5-5.
- <sup>b</sup> Based on sediment samples taken near the CWMCS pier assuming that non-detect values were equal to one-half the sample quantitation limit. Pore water concentrations are listed in Tables 3-5 and 3-6.
- <sup>c</sup> Toxicity Quotient equals sediment pore water concentration divided by the mean toxicity reference value. TQs based on mean pore water concentration data were calculated only if the upper-bound TQ exceeded one. All TQs were rounded to one significant figure.

**TABLE 7-4**  
**SUMMARY OF TQS GREATER THAN OR EQUAL TO ONE**  
**BASED ON THE MEAN TOXICITY REFERENCE VALUE**

<b>Chemical</b>	<b>Receptor Group</b>	<b>Upper-Bound and (Mean) TQs Based on the Minimum TRV</b>
Zinc	All benthic organisms	3 (3)
Diethyl phthalate	All benthic organisms	3 (2)
Phenol	All benthic organisms	2 (2)

**TABLE 7-5**  
**TOXICITY QUOTIENTS FOR CHEMICALS OF POTENTIAL CONCERN IN**  
**SURFACE WATER USING WORST-CASE (MINIMUM) TOXICITY REFERENCE VALUES**

Chemical	Minimum Toxicity Reference Value (µg/L) <sup>a</sup>	Upper-Bound and (Mean) Concentration in Pore Water Near the CWMCS Pier (µg/L) <sup>b</sup>	Upper-Bound and (Mean) Toxicity Quotients <sup>c</sup>
Toluene	145	3.0 (2.0)	0.02

- <sup>a</sup> Minimum Toxicity Reference Value is listed in Table 5-1.
- <sup>b</sup> Based on surface water samples taken in the vicinity of the CWMCS pier assuming that non-detect values were equal to one-half the sample quantitation limit.
- <sup>c</sup> Toxicity Quotient equals surface water concentration divided by the minimum toxicity reference value. TQs based on mean surface water data were calculated only if the upper-bound TQ exceeded one. All TQs were rounded to one significant figure.

**TABLE 7-6**  
**DERIVATION OF PORE WATER CONCENTRATIONS FOR**  
**CHEMICALS OF POTENTIAL CONCERN IN CLAY**

Chemical	$K_p$ Value (L/kg) <sup>a</sup>	Upper-Bound Concentration in Clay ( $\mu\text{g/kg}$ ) <sup>b</sup>	Estimated Upper-bound Concentration in Pore Water ( $\mu\text{g/L}$ ) <sup>c</sup>	Mean Concentration in Clay ( $\mu\text{g/kg}$ ) <sup>b</sup>	Estimated Mean Concentration in Pore Water ( $\mu\text{g/L}$ ) <sup>c</sup>
<b>METALS</b>					
Antimony	45	3606	80.1	3550	78.9
Arsenic	200	11,742	58.7	10,430	52.2
Beryllium	650	664	58.7	616	0.95
Cadmium	6.4	3085	482	2644	413
Chromium	850	16,219	19.1	14,791	17.4
Copper	35	37,619	1075	34,522	986
Lead	400	23,239	58.1	20,391	51.0
Mercury	10	53.5	5.35	49.5	4.95
Nickel	150	33,375	222.5	31,696	211
Silver	46	602	13.1	591	12.85
Zinc	38	67,337	1772	62,130	1635

- <sup>a</sup>  $K_p$  equals  $K_d$ .  $K_d$  values were taken from Baes *et al.* (1984).
- <sup>b</sup> Upper-bound and mean concentrations are based on all clay samples taken from the CWMCS facility ( $n = 23$ ) assuming that non-detects were equal to one-half the sample quantitation limit. Clay data are summarized in Table 2-1.
- <sup>c</sup> Pore water concentration equals the concentration in clay divided by  $K_p$ .



**TABLE 7-7**  
**COMPARISON OF ESTIMATED PORE WATER CONCENTRATIONS FOR**  
**METALS OF POTENTIAL CONCERN IN CLAY AND CHRONIC**  
**AMBIENT WATER QUALITY CRITERIA**

Chemical	Estimated Upper-Bound Pore Water Concentration ( $\mu\text{g/L}$ ) <sup>a</sup>	Estimated Mean Pore Water Concentration ( $\mu\text{g/L}$ ) <sup>a</sup>	Federal Ambient Water Quality Criteria ( $\mu\text{g/L}$ )	Illinois Ambient Water Quality Criteria ( $\mu\text{g/L}$ )	Does the Upper-Bound Pore Water Concentration Exceed AWQC? <sup>b</sup>
<b>METALS</b>					
Antimony	80.1	78.9	1600	NA <sup>c</sup>	No
Arsenic	58.7	52.2	440	190 <sup>d</sup>	No
Beryllium	1.0	0.95	5.3	NA	No
Cadmium	482	413	1.8 <sup>d</sup>	1.8 <sup>d</sup>	Yes
Chromium	19.1	17.4	8852 <sup>d,e</sup>	338 <sup>d,e</sup>	No
Copper	1075	986	19.5 <sup>d</sup>	19.7 <sup>d</sup>	Yes
Lead	58.1	51.0	353 <sup>d</sup>	175 <sup>d</sup>	No
Mercury	2.35	4.95	0.002	0.5	Yes
Nickel	222.5	211	2907	1000	No
Silver	13.1	12.85	11.2 <sup>d</sup>	5.0	Yes
Zinc	1772	1635	525 <sup>d</sup>	1000	Yes

<sup>a</sup> Upper-bound (95 percent upper confidence limit) and mean concentrations are based on clay samples taken during Phase II facility investigations (n = 23) assuming that non-detect values were equal to one-half the sample quantitation limit. Pore water concentrations were derived using the methodology outlined in Section 3.4.1 and are shown in Table 7-5.

<sup>b</sup> Only those metals whose upper-bound pore water concentration exceeded AWQC were further evaluated using the TQ approach.

<sup>c</sup> AWQC are not available for that chemical.

<sup>d</sup> Derived using the mean facility-specific hardness value of 182 mg CaCO<sub>3</sub>/L.

<sup>e</sup> Value is for trivalent chromium.

**TABLE 7-8**  
**TOXICITY QUOTIENTS FOR CHEMICALS OF POTENTIAL CONCERN IN CLAY**  
**USING WORST-CASE (MINIMUM) TOXICITY REFERENCE VALUES**

Chemical	Minimum Toxicity Reference Value (µg/L)	Upper-Bound and (Mean) Concentration in Clay Pore Water (µg/L) <sup>a</sup>	Upper-Bound and (Mean) Toxicity Quotients <sup>b</sup>
<b>METALS</b>			
Cadmium	6.5 <sup>c</sup>	482 (413)	74 (64)
Copper	2.2 <sup>d</sup>	1075 (986)	489 (448)
Mercury	6.1 <sup>e</sup>	5.4 (5.0)	0.9
Silver	193 <sup>e</sup>	13.1 (12.9)	0.07
Zinc	38.6 <sup>e</sup>	1722 (1635)	45 (43)

- <sup>a</sup> Based on clay data assuming that non-detect values were equal to one-half the sample quantitation limit (n = 23). Clay data are summarized in Table 2-1. Clay pore water concentrations are derived in Table 7-5.
- <sup>b</sup> Toxicity Quotient equals clay pore water concentration divided by the minimum toxicity reference value. TQs based on mean clay pore water concentration were calculated only if the upper-bound TQ exceeded one. All TQs were rounded to one significant figure.
- <sup>c</sup> Minimum Toxicity Reference Value is listed in Table 7 of Appendix B.
- <sup>d</sup> Minimum Toxicity Reference Value is listed in Table 8 of Appendix B.
- <sup>e</sup> Minimum Toxicity Reference Value is listed in Table 5-5.

**TABLE 7-9**  
**TOXICITY QUOTIENTS FOR CHEMICALS OF POTENTIAL CONCERN IN CLAY**  
**USING MEAN TOXICITY REFERENCE VALUES**

Chemical	Mean Toxicity Reference Value (µg/L)	Upper-Bound and (Mean) Concentration in Clay Pore Water (µg/L) <sup>a</sup>	Upper-Bound and (Mean) Toxicity Quotients <sup>b</sup>
Cadmium	74.3 <sup>c</sup>	482 (413)	7 (6)
Copper	22.8 <sup>d</sup>	1075 (986)	49 (45)
Zinc	2189 <sup>e</sup>	1772 (1635)	0.8

- <sup>a</sup> Based on clay assuming that non-detect values were equal to one-half the sample quantitation limit (n = 23). Clay data are summarized in Table 2-1.
- <sup>b</sup> Toxicity Quotient equals clay pore water concentration (Table 7-5) divided by the minimum toxicity reference value. TQs based on mean clay pore water concentrations were calculated only if the upper-bound TQ exceeded one. All TQs were rounded to one significant figure.
- <sup>c</sup> Mean Toxicity Reference Value is listed in Table 7 of Appendix B.
- <sup>d</sup> Mean Toxicity Reference Value is listed in Table 8 of Appendix B.
- <sup>e</sup> Mean Toxicity Reference Value is listed in Tables 5-5.

## 8.0 SUMMARY AND CONCLUSIONS

This report presents the findings of the Ecological Risk Assessment (ERA) conducted for the Chicago Incinerator facility. Identification of chemicals of potential concern (COPCs) was followed by selection of key ecological receptors and potential pathways of exposure. This was followed by quantification of chronic exposure (dose) by key receptor species. Subsequently, the identification of ecological endpoints relevant to this site was followed by the effects assessment. Effects assessment identifies compounds that may result in adverse effects to exposed populations. Risk characterization integrated information from the exposure and effects assessments as well as other relevant data from the scientific literature to yield risk estimates. A detailed, qualitative analysis of uncertainty was also presented.

Selection of COPCs involved several steps. The first phase included the screening of chemicals after detection limits, detection frequencies, and blank samples were examined, while the second phase involved comparing the measured chemical concentrations in sediments to media-specific baseline data. Clay samples collected from the CWMCS facility during the Phase II investigation were used in these comparisons. Clay samples are appropriate for baseline comparisons because studies conducted in the Lake Calumet area (IDENR, 1988) have shown that Lake Calumet sediments have been contaminated by past waste disposal activities. Consequently, clay samples represent baseline conditions prior to anthropologic disposal activities either on the facility or in the vicinity of the property. As a result, metals detected at statistically significant increased concentrations in sediment were selected as COPCs. Results of the t-test, comparing near-pier sediment and clay levels, show that sediment levels of arsenic, beryllium, chromium, lead, mercury, phenanthrene, silver, and zinc were higher than clay levels; hence these chemicals were retained as COPCs for sediment. Since acenaphthene, anthracene, antimony, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, 1,2-trans-dichloroethylene, diethyl phthalate, fluoranthene, fluorene, heptachlor, indeno(1,2,3-cd)pyrene, methylene chloride, naphthalene phenol, and pyrene were not detected in at least five percent of the clay samples analyzed but were detected

in near-pier sediments, these chemicals were also retained as COPCs for sediments. Only one chemical, toluene, was detected in more than five percent of the surface water samples analyzed, and thus retained as a COPC for surface water.

Environmental receptors are those organisms that may have been, are being, or may be exposed to COPCs. Environmental receptors were identified by considering the relevant exposure pathways and the potential or known occurrence of species exposed via those pathways. Selection of key receptor species was designed to minimize the possibility that other species would be more exposed than the key species themselves and to include representation of sensitive organisms present. Key species selected were:

- Centrarchids (e.g., bluegill and bass) - fish that dwell in and feed on other small fish in the water column
- Cyprinids (minnows) - fish that serve as prey for higher trophic level organisms
- Ictalurids (bullheads and catfish) - bottom dwelling vertebrates
- Water and benthic column invertebrates.

The primary exposure route for aquatic organisms inhabiting Lake Calumet was assumed to be respiration (i.e., uptake of contaminants over the water/gill interface). Although incidental ingestion of suspended or bottom sediments while foraging by benthic organisms is possible, uptake of COPCs present in the water column or in sediment pore water across the gills was assumed to be the primary pathway of exposure. Although prey may accumulate COPCs, there is no reliable means of modeling such exposures for this assessment. Fish were not sampled during RFI activities, since it is impossible to determine if measured levels of chemicals in fish were solely attributable to releases from the CWMCS facility. While this may be an important exposure pathway, attempts to model intakes from this pathway would introduce great uncertainty into the exposure assessment.

Exposures by terrestrial animals who may consume water from Lake Calumet near the facility are expected to be minimal. Water fowl and shorebirds, which are known to occur in the area, tend to feed largely on aquatic organisms taken from throughout Lake Calumet (not just the area near the facility) as well as other water bodies in the area. Although it is possible that waterfowl and shorebirds may search for food in areas of Lake Calumet near the facility, surface water around the facility contains relatively low levels of toluene. Furthermore, the home ranges of most species known or suspected to occur in the area of the facility are large relative to the area affected by releases from the facility. Similarly, the area surrounding the site is largely open land that provides minimal habitat and cover for non-aquatic bird species. Much of the open land around the facility is primarily occupied by other waste management facilities (i.e., landfills) with little vegetative cover and some wetlands. Finally, habitat within the CWMCS property for a majority of the indigenous small mammal species is limited or non-existent, and large mammals are not likely to frequent the site. The chain link security fence essentially isolates approximately one-half of the facility and encloses the remainder of the facility from any large mammal encroachment. In summary, exposures by birds and other terrestrial animals to facility-related contaminants are expected to be minimal and, therefore, were not quantified.

Next, specific ecological endpoints (EEs) that were used to evaluate potential adverse effects were identified. EEs are characteristics of an ecological system that may be affected by site-related metals and as such epitomize the actual environmental values to be protected. It is important to emphasize that no one ecological endpoint was used as a single, rigid standard.

The first step in the effects assessment was to compare measured and estimated levels of COPCs in surface water, sediment, and sediment pore water to chronic state and federal AWQC and SQC. Chemicals without AWQC or SQC, and those whose upper-bound concentration exceeded the applicable criterion were evaluated further by calculating toxicity quotients (TQs). TQs represent a commonly-used method of evaluating the possibility that aquatic populations could be experiencing chronic effects from exposure to facility-related COPCs. The TQ approach was used to evaluate the potential for adverse effects to receptors within the same ecologic group. For example, if smallmouth bass were not expected to experience adverse effects, then it is

reasonable to assume that other pelagic fish species (that eat primarily fish, but will occasionally take other food items as available) would also be unlikely to experience adverse effects.

The first step in calculating TQs is deriving Toxicity Reference Values (TRVs). A TRV is an exposure estimate for a receptor group, including sensitive subgroups, that is not likely to cause appreciable deleterious effects from chronic exposure. Typically, ecological risk assessment assumes that if the TRV is not exceeded, the species of interest will be protected. Maximum Acceptable Toxicant Concentrations (MATCs), which are a standard chronic test endpoint for aquatic receptors, were used as TRVs. They are the calculated or approximated threshold for statistically significant effects on growth, reproduction, or survival. The MATC is defined as the effects threshold at or below which adverse chronic effects are not expected to occur. MATCs were estimated using  $LC_{50}$  data (the concentration causing death in 50 percent of exposed individuals) and the predictive regression models developed by Suter *et al.* (1987) and Suter (1986).

Risk characterization evaluates potential adverse effects to key aquatic species associated with exposure to COPCs in surface water and sediments. TQ results were evaluated using these criteria: (1) TQs less than one clearly represent no impact to exposed individuals, and (2) TQs greater than or equal to one indicate that adverse chronic impacts to exposed individuals and populations are possible, but the extent of population-level effects cannot be accurately determined. A TQ of one indicates that the measured concentration exceeds a concentration that caused some impact in a certain test species under a given set of experimental conditions. In this sense, TQs greater than one can be used to indicate that chronic adverse impacts to exposed individuals are possible. Given that the goal of this ERA is to evaluate potential adverse effects on exposed populations, a TQ of one may be overly conservative.

Potential adverse effects from exposure to COPCs in sediments near the CWMCS facility by mobile and sessile benthic organisms were evaluated using the following approach.

1. The upper-bound concentration of a chemical in pore water was compared to the minimum TRV for each chemical.
2. For those chemicals whose TQs based on the minimum TRV were equal to or greater than 1, the upper-bound and mean concentration of a chemical in pore water was compared to the mean TRV.

Minimum TRV data were conservatively assumed to adequately account for the varying toxicities of the chemicals detected in Lake Calumet sediments as well as the different bottom dwelling species known or suspected to inhabit sediments near the CWMCS facility. Furthermore, mean concentration data were assumed to better reflect the temporal and spatial variations to which mobile aquatic species may potentially be exposed. Hence, adverse population-level effects were not considered probable for mobile benthic organisms unless the arithmetic mean pore water concentration exceeded the minimum TRV. Conversely, population-level adverse effects for sessile benthic organisms were considered possible if the upper-bound pore water concentration exceed the minimum TRV.

TQs for COPCs in surface water and sediment that exceed unity are summarized in the following table.



Chemical	Receptor Group	Upper-Bound and (Mean) TQs Based on the Minimum TRV
Mercury	All benthic organisms	4 (2)
Zinc	All benthic organisms	187 (161)
Diethyl phthalate	All benthic organisms	12 (10)
Naphthalene	Sessile benthic organisms only	1 (0.8)
Phenol	All benthic organisms	3 (2)

These data show that exposure to mercury, zinc, diethyl phthalate, and phenol may cause adverse effects in potentially exposed mobile and sessile benthic organisms. Sessile benthic organisms only may experience adverse effects from potential exposure to naphthalene in sediments near the facility.

These quantitative results must be put into perspective by considering the following. First, Lake Calumet has been impacted by a variety of non-point sources, including highway runoff, surface runoff from industrial properties, and seepage of contaminated groundwater from nearby landfills, waste lagoons, and underground storage tanks for more than 100 years (IDENR, 1988). Industrial development, primarily iron and steel manufacturing, began in 1869 around Lake Calumet. By 1913, five metal processing industries were located on the west side of Lake Calumet. Untreated liquid wastes were discharged into Lake Calumet, and solid wastes were dumped on adjacent vacant land (IDENR, 1988). In 1940, the City of Chicago built a dike at 110th Street across from Lake Calumet to provide open space for solid and industrial waste disposal. In 1986, the Illinois EPA (IEPA) found that untreated leachate from this waste disposal unit was flowing into area surface water bodies, including Lake Calumet. Additionally, samples taken from various landfill sites around Lake Calumet contained elevated levels of heavy metals and polycyclic aromatic hydrocarbons (PAHs) (IDENR, 1988).

Second, aquatic receptors are not exposed directly to undiluted groundwater. Although shallow groundwater present in the fill is hydraulically connected to Lake Calumet, groundwater flow to Lake Calumet is slow and does not significantly impact Lake Calumet water levels. A worst-case scenario, based on observed hydrogeology and groundwater chemistry conditions at the facility pier, was modeled to simulate the potential flux of benzene into Lake Calumet. Results of the modelling predicted that the potential discharge of benzene, and hence other compounds, was very low (see Section 4.2.5 of the FRI; CWMCS, 1993). Furthermore, since levels of chemicals in Lake Calumet and groundwater within the fill are likely at steady-state given that waste materials have been present on-site for more than 20 years, levels of chemicals in surface water and sediment near the facility are not expected to increase over time. Thus, attribution of chemicals detected in sediments near the facility pier to releases from the facility is tenuous.

Third, a comparison of current-day aquatic species diversity with historical records shows that while species diversity in Lake Calumet has decreased over time, the current Lake Calumet fish community remains diverse (IDENR, 1988). **Information concerning the status of aquatic species inhabiting Lake Calumet was obtained from IDENR (1988). Detailed information on the size of aquatic species is not available. Investigations into the size and number of aquatic populations inhabiting Lake Calumet is beyond the scope of this assessment.**

Disparities between observational field data (i.e., a diverse fish community) and calculated TQs (which indicate potential chronic effects from exposure) could be due to several factors that could ameliorate the toxicity of chemical levels in Lake Calumet sediments. These factors include metals speciation, high alkalinity and hardness, acclimation and evolutionary tolerance of indigenous species, and bioavailability. It is possible that the concentration of chemicals that are potentially bioavailable may be significantly lower than the total recoverable levels measured in sediments. The toxicity of chemicals in sediments is affected by the extent that the chemicals bind to the sediments (DiToro *et al.*, 1990). The more a chemical binds to sediments, the less bioavailable (and hence less toxic) it is. As a result, sediments with similar chemical levels can exhibit varying toxicities. For example, total metals levels are often not good indicators of the fraction that is actually bioavailable (Adams *et al.*, 1992). Sulfides can bind with metal ions and

form insoluble precipitates that can account for the lack of toxicity when high metals levels are present (Adams *et al.*, 1992). In addition, acclimation and/or adaptation of fish populations to chemicals has been documented in the literature (Chapman, 1985; 1989).

The cumulative impact of these mitigating factors in conjunction with the fact that chemical levels measured in sediments near the facility may be attributable to numerous other local sources and that the species currently in resident do not exhibit an apparent pattern of acute toxicity (based on the fact that facility personnel have not observed large fish kills) suggest that the resulting TQs may be overly conservative. Discrepancies between field observations and TQ data are difficult to reconcile since numerous sources have been discharging chemicals into Lake Calumet for more than 100 years. There is considerable uncertainty associated with the derivation of sediment pore water concentrations and the calculation of TQs. As a result, the actual toxicity of many chemicals to aquatic receptors cannot be precisely characterized.

Finally, terrestrial receptors (birds as well as small and large mammals) are not expected to experience adverse effects from exposure to COPCs for the following reasons: no federal or state-listed T&E bird species have been observed on-site, nor are they expected to occur due to the materials of construction of the fill and the lack of mature vegetative growth; there is insufficient terrestrial habitat on-site to support a viable terrestrial ecosystem; the area immediately surrounding the facility is almost exclusively heavy industrial, which does not offer suitable habitat for a diverse terrestrial community; and, water fowl and shorebirds, which are known to occur in the area, tend to feed largely on aquatic organisms taken from throughout Lake Calumet (not just the area near the facility), as well as other water bodies in the area. Although it is possible that waterfowl and shorebirds may search for food in areas of Lake Calumet near the facility, dose to these receptors from potential exposure to facility-related contaminants is expected to be minimal because: (1) fish consumed from Lake Calumet near the facility may be only a small fraction of their total dietary intake; (2) toluene was the only COPC identified in surface water samples collected near the pier; and (3) most of the birds are not expected to overwinter in the area. Furthermore, potential exposures by non-aquatic bird species were not modeled since: (1) the area immediately surrounding the facility is largely open land

that provides minimal habitat and cover for non-aquatic bird species; (2) the open land immediately around the facility is primarily other waste management facilities (i.e., landfills) with little vegetative cover; and (3) the home ranges of these species are large relative to the area occupied by the facility. Finally, the facility provides limited potential habitat for small mammals, such as rodents (mice, rats and vole). The facility is constructed on a man-made pier that has become vegetated with invader-type plant species typical of an early successional community. As such, habitat for a majority of the indigenous small mammal species is limited or non-existent. Similarly, large mammals are not likely to frequent the facility. The eastern portion of the facility is enclosed by a tall chain-link security. The fence essentially isolates approximately one-half of the pier and encloses the remainder of the pier from large mammal encroachment.

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## **APPENDICES**

## **APPENDIX A**

CWMCS LAKE CALUMET ECOLOGICAL RISK ASSESSMENT

CONCENTRATION OF METALS IN SEDIMENT SAMPLES SITE WIDE - Phase I and II Results (Mg/kg = micrograms per kilogram)

-DATA FROM VALIDATION REPORTS (APPENDIX N) WERE GIVEN PRIMACY.

-ETC LABORATORY REPORTS WERE CONSULTED FOR RESOLUTION OF BMDL VALUES.

-BMDL VALUES AND NON-DETECTS WERE ASSUMED TO BE EQUAL TO ONE-HALF THE SAMPLE QUANTITATION LIMIT.

	Antimony	Arsenic	Beryllium	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Silver	Zinc
S-1-1	20000	26000	590	770	38000	66000	120000	160	39000	1000	330000
S-2-1	6000	26000	500	680	30000	49000	91000	80	32000	1000	260000
S-3-1	18000	25000	450	580	28000	49000	88000	190	30000	1000	260000
S-4-1	24000	30000	290	135	13000	25000	50000	55	23000	700	220000
S-5-1	3750	22000	230	1400	8800	17000	29000	50	11000	600	160000
S-7-1	17000	32000	290	430	14000	28000	56000	55	18000	650	200000
S-8-1	6000	20000	680	2800	28000	57000	110000	180	31000	2600	290000
S-9-1	6500	18000	780	1900	31000	53000	120000	270	32000	2200	270000
S-10-1	8500	17000	1100	2000	39000	57000	160000	250	39000	1400	310000
S-11-1	4400	15000	420	2000	15000	31000	150000	330	20000	2200	190000
S-12-1	8000	17000	880	1400	32000	46000	130000	240	33000	1350	270000
S-13-1	7500	12000	1000	2000	38000	56000	150000	290	39000	1250	310000
S-14-1	8500	3800	1000	1900	37000	53000	150000	340	41000	1450	300000
S-15-1	6500	17000	860	2700	36000	65000	170000	320	40000	1100	310000
S-16-1	4200	27000	280	880	9200	25000	33000	55	13000	700	130000
S-17-1	22000	20000	500	450	29000	53000	94000	170	36000	900	290000
S-18-1	17000	14000	350	310	20000	34000	63000	110	22000	600	190000
S-19-1	4200	23000	450	3600	14000	26000	46000	55	18000	700	160000
S-20-1	4400	28000	460	4000	12000	23000	42000	60	16000	1600	250000
S-21-1	11000	24000	210	135	9100	22000	29000	55	14000	700	170000
S-22-1	15000	35000	210	125	6900	21000	22000	50	17000	650	55000
S-23-1	4150	28000	440	4000	13000	31000	50000	110	19000	700	240000
S-24-1	4250	87000	510	4400	16000	33000	66000	120	21000	700	250000
S-25-1	4750	21000	570	4200	20000	37000	77000	140	20000	800	240000
S-26-1	6000	21000	640	2500	30000	49000	100000	170	28000	2200	280000
S-27-1	6500	18000	990	3700	51000	74000	160000	180	43000	3100	410000
S-28-1	15000	17000	510	800	33000	46000	110000	130	34000	800	373000
S-29-1	30000	26700	730	890	54000	65000	150000	200	40000	1100	380000
S-30-1	5500	16000	1200	3100	72000	64000	130000	220	37000	2400	420000
S-1-2	3800	16000	1100	3600	50000	35000	72000	50	16000	650	97000
S-2-2	3600	14000	1200	6600	198000	22000	48000	48	12000	600	74000
S-3-2	3750	13000	570	3100	25000	27000	80000	50	14000	650	150000
S-4-2	3850	14000	1600	4500	100000	24000	33000	50	18000	650	140000
S-5-2	12000	8100	1600	6200	60000	27000	37000	49	18000	600	140000
S-6-2	4250	6500	930	4100	25000	30000	86000	55	16000	700	120000
S-7-2	3900	11000	610	2500	30000	27000	50000	50	15000	650	82000
S-8-2	3500	7900	470	2100	139000	12000	41000	46.5	5000	600	35000
S-9-2	4200	17000	560	2200	13000	65000	120000	55	12000	700	120000
S-10-2	4050	32000	1100	4900	21000	60000	400000	150	16000	650	499000
Min	3500.0	3800.0	210.0	125.0	6900.0	12000.0	22000.0	46.5	5000.0	600.0	35000.0
Max	30,000.0	87,000.0	1,600.0	6,600.0	198,000.0	74,000.0	400,000.0	340.0	43,000.0	3,100.0	499,000.0
Mean	8,859.0	21,179.5	688.7	2,399.6	36,871.8	40,615.4	95,205.1	134.3	24,307.7	1,092.3	230,128.2
STD	6,742.9	13,121.2	360.0	1,705.1	36,945.5	16,912.5	66,907.7	92.3	10,633.0	655.2	107,677.4
n	39	39	39	39	39	39	39	39	39	39	39
UCL	10,680.5	24,724.0	786.0	2,860.2	46,852.1	45,184.1	113,279.3	159.3	27,180.1	1,269.3	259,215.8
%DET	28	97	97	90	95	95	95	51	95	21	95

All samples whose reported concentration did not exceed the sample quantitation limit were treated as non-detects in determining detection frequency.

CONCENTRATION OF METALS IN NEAR-PIER SEDIMENT SAMPLES ONLY (MICROGRAMS/KILOGRAM)

-DATA FROM VALIDATION REPORTS (APPENDIX N) WERE GIVEN PRIMACY.

-ETC LABORATORY REPORTS WERE CONSULTED FOR RESOLUTION OF BMDL VALUES.

-BMDL VALUES AND NON-DETECTS WERE ASSUMED TO BE EQUAL TO ONE-HALF THE SAMPLE QUANTITATION LIMIT.

	Antimony	Arsenic	Beryllium	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Silver	Zinc
S-7-1	17000	32000	290	430	14000	28000	56000	55	18000	650	200000
S-8-1	6000	20000	680	2800	28000	57000	110000	180	31000	2600	290000
S-9-1	6500	18000	780	1900	31000	53000	120000	270	32000	2200	270000
S-10-1	8500	17000	1100	2000	39000	57000	160000	250	39000	1400	310000
S-11-1	4400	15000	420	2000	15000	31000	150000	330	20000	2200	190000
S-12-1	8000	17000	880	1400	32000	46000	130000	240	33000	1350	270000
S-13-1	7500	12000	1000	2000	38000	56000	150000	290	39000	1250	310000
S-14-1	8500	3800	1000	1900	37000	53000	150000	340	41000	1450	300000
S-15-1	6500	17000	860	2700	36000	65000	170000	320	40000	1100	310000
S-16-1	4200	27000	280	880	9200	25000	33000	55	13000	700	130000
S-23-1	4150	28000	440	4000	13000	31000	50000	110	19000	700	240000
S-24-1	4250	87000	510	4400	16000	33000	66000	120	21000	700	250000
S-25-1	4750	21000	570	4200	20000	37000	77000	140	20000	800	240000
S-26-1	6000	21000	640	2500	30000	49000	100000	170	28000	2200	280000
S-27-1	6500	18000	990	3700	51000	74000	160000	180	43000	3100	410000
S-28-1	15000	17000	510	800	33000	46000	110000	130	34000	800	373000
S-29-1	30000	26700	730	890	54000	65000	150000	200	40000	1100	380000
S-30-1	5500	16000	1200	3100	72000	64000	130000	220	37000	2400	420000
S-1-2	3800	16000	1100	3600	50000	35000	72000	50	16000	650	97000
S-2-2	3600	14000	1200	6600	198000	22000	48000	48	12000	600	74000
S-3-2	3750	13000	570	3100	25000	27000	80000	50	14000	650	150000
S-4-2	3850	14000	1600	4500	100000	24000	33000	50	18000	650	140000
S-5-2	12000	8100	1600	6200	60000	27000	37000	49	18000	600	140000
S-6-2	4250	6500	930	4100	25000	30000	86000	55	16000	700	120000
S-7-2	3900	11000	610	2500	30000	27000	50000	50	15000	650	82000
S-8-2	3500	7900	470	2100	139000	12000	41000	46.5	5000	600	35000
S-9-2	4200	17000	560	2200	13000	65000	120000	55	12000	700	120000
S-10-2	4050	32000	1100	4900	21000	60000	400000	150	16000	650	499000
Min	3500.0	3800.0	280.0	430.0	9200.0	12000.0	33000.0	46.5	5000.0	600.0	35000.0
Max	30,000.0	87,000.0	1,600.0	6,600.0	198,000.0	74,000.0	400,000.0	340.0	43,000.0	3,100.0	499,000.0
Mean	7,148.2	19,750.0	807.9	2,907.1	43,900.0	42,821.4	108,535.7	150.1	24,642.9	1,183.9	236,785.7
STD	5,616.6	14,961.5	351.6	1,560.5	41,205.3	16,881.0	72,519.0	99.9	11,215.8	735.7	118,286.3
n	28	28	28	28	28	28	28	28	28	28	28
UCL	8,955.8	24,565.2	921.0	3,409.4	57,161.4	48,254.3	131,875.0	182.3	28,252.5	1,420.7	274,854.6

All samples whose reported concentration did not exceed the sample quantitation limit were treated as non-detects in determining detection frequency.

CONCENTRATION OF METALS IN LAKE CALUMET SEDIMENT SAMPLES - Phase I and II Results (Mg/kg = micrograms per kilogram)

-DATA FROM VALIDATION REPORTS (APPENDIX N) WERE GIVEN PRIMACY.

-ETC LABORATORY REPORTS WERE CONSULTED FOR RESOLUTION OF BMDL VALUES.

-BMDL VALUES AND NON-DETECTS WERE ASSUMED TO BE EQUAL TO ONE-HALF THE SAMPLE QUANTITATION LIMIT.

	Antimony	Arsenic	Beryllium	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Silver	Zinc
S-1-1	20000	26000	590	770	38000	66000	120000	160	39000	650	330000
S-2-1	6000	26000	500	680	30000	49000	91000	80	32000	1000	260000
S-3-1	18000	25000	450	580	28000	49000	88000	190	30000	1000	260000
S-4-1	24000	30000	290	135	13000	25000	50000	55	23000	700	220000
S-5-1	3750	22000	230	1400	8800	17000	29000	50	11000	600	160000
S-17-1	22000	20000	500	450	29000	53000	94000	170	36000	900	290000
S-18-1	17000	14000	350	310	20000	34000	63000	110	22000	600	190000
S-19-1	4200	23000	450	3600	14000	26000	46000	55	18000	700	160000
S-20-1	4400	28000	460	4000	12000	23000	42000	60	16000	1600	250000
S-21-1	11000	24000	210	135	9100	22000	29000	55	14000	700	170000
S-22-1	15000	35000	210	125	6900	21000	22000	50	17000	650	55000
Min	3750.0	14000.0	210.0	125.0	6900.0	17000.0	22000.0	50.0	11000.0	600.0	55000.0
Max	24,000.0	35,000.0	590.0	4,000.0	38,000.0	66,000.0	120,000.0	190.0	39,000.0	1,600.0	330,000.0
Mean	13,213.6	24,818.2	385.5	1,107.7	18,981.8	35,000.0	61,272.7	94.1	23,454.5	827.3	213,181.8
STD	7,651.5	5,437.2	133.4	1,384.4	10,594.6	16,407.3	32,370.0	54.2	9,427.2	296.1	76,428.8
n	11	11	11	11	11	11	11	11	11	11	11
UCL	17,394.0	27,788.8	458.4	1,864.1	24,770.1	43,963.9	78,957.7	123.7	28,605.0	989.0	254,937.8

CONCENTRATION OF ORGANICS IN SEDIMENT - SITE WIDE (Mg/kg = micrograms per kilogram)

-DATA FROM VALIDATION REPORTS (APPENDIX N) WERE GIVEN PRIMACY.

-ETC LABORATORY REPORTS WERE CONSULTED FOR RESOLUTION OF BMDL VALUES.

-BMDL VALUES AND NON-DETECTS WERE ASSUMED TO BE EQUAL TO ONE-HALF THE SAMPLE QUANTITATION LIMIT.

	Anthracene	BaP	BkFl	BbFl	Chrysene	Fluoranthene	Fluorene	Phenanthrene	Pyrene	Hepachlor	1,2 t-DCE	MC	BEHP	Benzene
S-1-1	200	526	260	500	908	1280	200	550	1280	5	0.8	10.9	1060	2.2
S-2-1	180	589	235	455	843	1340	180	500	1230	5	0.8	9.41	950	2.2
S-3-1	175	230	230	445	820	1220	175	500	1070	33.7	4	432	950	11
S-4-1	125	165	165	315	165	355	125	350	330	3.2	3.21	35.4	850	2.2
S-5-1	155	205	205	390	424	847	155	440	835	3.25	2.39	18.8	800	2.2
S-7-1	349	539	185	355	678	1490	140	1200	1350	17.8	1.6	214	750	4.4
S-8-1	200	622	265	500	557	973	200	550	844	5.5	3.13	13.1	1050	2.2
S-9-1	2100	2800	2800	5500	2800	2450	2100	6000	2100	55	0.8	10.6	11000	2.2
S-10-1	2500	3300	3300	6500	3300	2900	2500	7000	2500	65	0.8	14.3	13000	2.2
S-11-1	1500	1950	1950	3750	1950	9410	1500	4200	8220	40.5	0.8	12.4	6000	2.2
S-12-1	2550	3350	3350	6500	3350	2950	2550	7500	2550	65	0.8	16.3	13500	2.2
S-13-1	1200	1600	1600	3100	1600	1400	1200	3450	1200	65	1.98	16.6	6500	2.2
S-14-1	265	375	375	700	375	1460	285	800	1360	75	2.94	14.6	1500	2.2
S-15-1	2150	2800	2800	5500	2800	2400	2150	6000	4660	55	11.9	11.5	11000	2.2
S-16-1	1350	1800	1800	3450	1800	1550	1350	3850	1350	34	4	493	7000	11
S-17-1	185	240	240	465	240	859	185	500	750	4.75	1.81	22.1	8160	2.2
S-18-1	195	594	260	495	934	1460	195	560	1410	42.9	0.8	11	1050	2.2
S-19-1	145	190	190	365	502	799	145	410	760	3.8	0.8	32.1	750	2.2
S-20-1	155	200	200	385	200	785	155	435	681	40.5	0.8	36.5	800	2.2
S-21-1	440	608	170	330	627	1570	130	1410	1290	14.6	2.98	21	700	2.2
S-22-1	110	145	145	280	145	130	110	315	110	3	2.25	32.8	600	2.2
S-23-1	135	175	175	335	175	621	135	380	556	3.15	0.8	31.4	4530	2.2
S-24-1	872	806	611	350	1370	3720	742	3120	3450	36.5	0.8	51.4	750	2.2
S-25-1	1750	2300	2300	4400	2300	2000	1750	4950	1750	43.5	0.8	453	9000	2.2
S-26-1	185	758	586	470	875	1590	185	550	1430	4.95	0.8	15.3	1000	2.2
S-27-1	2200	2950	2950	5500	2950	2600	2200	6500	2200	6	2.45	13.4	11500	2.2
S-28-1	165	658	215	410	964	1660	165	465	1450	4	0.8	57.4	850	2.2
S-29-1	210	1100	987	550	1850	2430	210	1330	2220	71.7	0.8	19.3	1100	2.2
S-30-1	1900	2450	2450	4750	2450	2150	1900	5500	1900	49.5	0.8	8.82	10000	2.2
S-1-2	1200	4740	3600	9290	7160	16100	1200	10100	12400		1	1.75	6500	2.75
S-2-2	1150	1500	1500	2900	1500	1350	1150	3250	1150		0.95	1.7	6000	2.65
S-3-2	1200	1550	1550	3000	1550	2860	1200	3300	1200		1	1.75	6500	2.75
S-4-2	1200	1600	1600	3100	1600	1400	1200	3450	1200		1.05	1.8	6500	13
S-5-2	1150	1500	1500	2950	1500	1350	1150	3400	1150		1	1.7	6000	7.61
S-6-2	1350	1750	1750	3400	1750	3390	1350	3800	3300		1.15	1.96	7000	3.1
S-7-2	1200	1600	1600	3050	1600	1400	1200	3450	1200		1.05	1.8	6500	2.8
S-8-2	1100	1450	1450	2750	1450	1250	1100	3100	1100		0.9	1.6	5500	2.55
S-9-2	1300	1750	1750	3350	1750	1550	1300	3750	1300		1.1	1.95	7000	3.05
S-10-2	1250	1650	1650	3200	1650	8070	1250	3600	5970		1.05	1.85	8500	2.95
Min	110.0	145.0	145.0	280.0	145.0	130.0	110.0	315.0	110.0	3.0	0.8	1.6	600.0	2.2
Max	2550.0	4740.0	3600.0	9290.0	7160.0	16100.0	2550.0	10100.0	12400.0	75.0	11.9	493.0	13500.0	13.0
Mean	916.6	1361.9	1255.1	2411.2	1524.7	2387.7	900.4	2833.7	2071.9	29.5	1.7	55.0	4941.0	3.3
STD	766.4	1098.2	1080.9	2303.1	1287.1	2872.1	777.7	2481.6	2294.1	25.4	1.9	123.4	4055.8	2.6
n	39	39	39	39	39	39	39	39	39	29	39	39	39	39
UCL	1123.6	1658.6	1547.1	3033.3	1872.4	3163.5	1110.5	3504.1	2691.7	37.6	2.3	88.4	6036.6	4.0
%DET	35	35	24	41	54	84	24	73	86	14	26	76	43	18

Phase II samples (S-2-1 through S-2-10) were not analyzed for heptachlor; hence, sample size for heptachlor is only 29.



CONCENTRATION OF ORGANICS IN SEDIMENT - NEAR-PIER SAMPLES ONLY (Mg/kg = micrograms per kilogram)

-DATA FROM VALIDATION REPORTS (APPENDIX N) WERE GIVEN PRIMACY.

-ETC LABORATORY REPORTS WERE CONSULTED FOR RESOLUTION OF BMDL VALUES.

-BMDL VALUES AND NON-DETECTS WERE ASSUMED TO BE EQUAL TO ONE-HALF THE SAMPLE QUANTITATION LIMIT.

	Anthracene	BaP	BkFl	BbFl	Chrysene	Fluoranthene	Fluorene	Phenanthrene	Pyrene	Hepachlor	1,2,4-DCE	MC	BEHP	Benzene
S-7-1	349	539	185	355	678	1490	140	1200	1350	17.8	1.6	214	750	4.4
S-8-1	200	622	265	500	557	973	200	550	844	5.5	3.13	13.1	1050	2.2
S-9-1	2100	2800	2800	5500	2800	2450	2100	6000	2100	55	0.8	10.6	11000	2.2
S-10-1	2500	3300	3300	6500	3300	2900	2500	7000	2500	65	0.8	14.3	13000	2.2
S-11-1	1500	1950	1950	3750	1950	9410	1500	4200	8220	40.5	0.8	12.4	6000	2.2
S-12-1	2550	3350	3350	6500	3350	2950	2550	7500	2550	65	0.8	16.3	13500	2.2
S-13-1	1200	1600	1600	3100	1600	1400	1200	3450	1200	65	1.98	16.6	6500	2.2
S-14-1	265	375	375	700	375	1460	285	800	1360	75	2.94	14.6	1500	2.2
S-15-1	2150	2800	2800	5500	2800	2400	2150	6000	4660	55	11.9	11.5	11000	2.2
S-16-1	1350	1800	1800	3450	1800	1550	1350	3850	1350	34	4	493	7000	11
S-23-1	135	175	175	335	175	621	135	380	556	3.15	0.8	31.4	4530	2.2
S-24-1	872	806	611	350	1370	3720	742	3120	3450	36.5	0.8	51.4	750	2.2
S-25-1	1750	2300	2300	4400	2300	2000	1750	4950	1750	43.5	0.8	453	9000	2.2
S-26-1	185	758	586	470	875	1590	185	550	1430	4.95	0.8	15.3	1000	2.2
S-27-1	2200	2950	2950	5500	2950	2600	2200	6500	2200	6	2.45	13.4	11500	2.2
S-28-1	165	658	215	410	964	1660	165	465	1450	4	0.8	57.4	850	2.2
S-29-1	210	1100	987	550	1850	2430	210	1330	2220	71.7	0.8	19.3	1100	2.2
S-30-1	1900	2450	2450	4750	2450	2150	1900	5500	1900	49.5	0.8	8.82	10000	2.2
S-1-2	1200	4740	3600	9290	7160	16100	1200	10100	12400		1	1.75	6500	2.75
S-2-2	1150	1500	1500	2900	1500	1350	1150	3250	1150		0.95	1.7	6000	2.65
S-3-2	1200	1550	1550	3000	1550	2860	1200	3300	1200		1	1.75	6500	2.75
S-4-2	1200	1600	1600	3100	1600	1400	1200	3450	1200		1.05	1.8	6500	13
S-5-2	1150	1500	1500	2950	1500	1350	1150	3400	1150		1	1.7	6000	7.61
S-6-2	1350	1750	1750	3400	1750	3390	1350	3800	3300		1.15	1.96	7000	3.1
S-7-2	1200	1600	1600	3050	1600	1400	1200	3450	1200		1.05	1.8	6500	2.8
S-8-2	1100	1450	1450	2750	1450	1250	1100	3100	1100		0.9	1.6	5500	2.55
S-9-2	1300	1750	1750	3350	1750	1550	1300	3750	1300		1.1	1.95	7000	3.05
S-10-2	1250	1650	1650	3200	1650	8070	1250	3600	5970		1.05	1.85	8500	2.95
Min	135.0	175.0	175.0	335.0	175.0	621.0	135.0	380.0	556.0	3.2	0.8	1.6	750.0	2.2
Max	2550.0	4740.0	3600.0	9290.0	7160.0	16100.0	2550.0	10100.0	12400.0	75.0	11.9	493.0	13500.0	13.0
Mean	1202.9	1765.1	1666.0	3200.4	1916.2	2945.5	1191.5	3733.8	2537.9	38.7	1.7	53.0	6286.8	3.4
STD	722.7	1041.9	1011.4	2274.4	1315.9	3223.1	734.5	2378.3	2558.3	25.9	2.2	125.4	3832.2	2.7
n	28	28	28	28	28	28	28	28	28	18	28	28	28	28
UCL	1435.5	2100.4	1991.5	3932.3	2339.7	3982.8	1427.9	4499.2	3361.2	49.3	2.4	93.4	7520.1	4.2

Phase II samples (S-2-1 through S-2-10) were not analyzed for heptachlor; hence, sample size for heptachlor is only 29.

CONCENTRATION OF ORGANICS IN LAKE CALUMET SEDIMENT SAMPLES (Mg/kg = micrograms per kilogram)

-DATA FROM VALIDATION REPORTS (APPENDIX N) WERE GIVEN PRIMACY.

-ETC LABORATORY REPORTS WERE CONSULTED FOR RESOLUTION OF BMDL VALUES.

-BMDL VALUES AND NON-DETECTS WERE ASSUMED TO BE EQUAL TO ONE-HALF THE SAMPLE QUANTITATION LIMIT.

	Anthracene	BaP	BkFl	BbFl	Chrysene	Fluoranthene	Fluorene	Phenanthrene	Pyrene	Hepachl	1,2 t-DCE	MC	BEHP	Benzene
S-1-1	200	526	260	500	908	1280	200	550	1280	5	0.8	10.9	1060	2.2
S-2-1	180	589	235	455	843	1340	180	500	1230	5	0.8	9.41	950	2.2
S-3-1	175	230	230	445	820	1220	175	500	1070	33.7	4	432	950	11
S-4-1	125	165	165	315	165	355	125	350	330	3.2	3.21	35.4	850	2.2
S-5-1	155	205	205	390	424	847	155	440	835	3.25	2.39	18.8	800	2.2
S-17-1	185	240	240	465	240	859	185	500	750	4.75	1.81	22.1	8160	2.2
S-18-1	195	594	260	495	934	1460	195	560	1410	42.9	0.8	11	1050	2.2
S-19-1	145	190	190	365	502	799	145	410	760	3.8	0.8	32.1	750	2.2
S-20-1	155	200	200	385	200	785	155	435	681	40.5	0.8	36.5	800	2.2
S-21-1	440	608	170	330	627	1570	130	1410	1290	14.6	2.98	21	700	2.2
S-22-1	110	145	145	280	145	130	110	315	110	3	2.25	32.8	600	2.2
Min	110.0	145.0	145.0	280.0	145.0	130.0	110.0	315.0	110.0	3.0	0.8	9.4	600.0	2.2
Max	440.0	608.0	260.0	500.0	934.0	1570.0	200.0	1410.0	1410.0	42.9	4.0	432.0	8160.0	11.0
Mean	187.7	335.6	209.1	402.3	528.0	967.7	159.5	542.7	886.0	14.5	1.9	60.2	1515.5	3.0
STD	88.3	195.9	39.1	75.0	313.7	455.0	30.0	297.8	416.6	16.2	1.2	123.7	2208.4	2.7
n	11	11	11	11	11	11	11	11	11	11	11	11	11	11
UCL	236.0	442.7	230.5	443.3	699.4	1216.3	175.9	705.4	1113.6	23.4	2.5	127.8	2722.0	4.4

CONCENTRATION OF ORGANICS IN SEDIMENT - SITE WIDE (Mg/kg = micrograms per kilogram)

-DATA FROM VALIDATION REPORTS (APPENDIX N) WERE GIVEN PRIMACY.

-ETC LABORATORY REPORTS WERE CONSULTED FOR RESOLUTION OF BMDL VALUES.

-BMDL VALUES AND NON-DETECTS WERE ASSUMED TO BE EQUAL TO ONE-HALF THE SAMPLE QUANTITTATION LIMIT.

	Phenol	Acenaphth.	BA	B(ghi)P	Dieth Ph	Naphth.	I(123)P	Di-n-BP	Toluene
S-1-1	881	200	800	430	1050	170	495	1050	3
S-2-1	1160	180	750	390	950	150	445	950	3
S-3-1	1070	175	700	380	950	150	435	950	15
S-4-1	100	125	500	270	650	105	305	650	3
S-5-1	840	155	650	335	800	130	385	800	3
S-7-1	792	140	600	305	750	120	350	750	8
S-8-1	160	200	800	430	1050	170	495	1050	3
S-9-1	1650	2100	8500	4600	11000	1800	5000	11000	3
S-10-1	2000	2500	10500	5500	13000	2100	6000	13000	3
S-11-1	1150	1500	6000	3200	8000	1250	3650	8000	3
S-12-1	2000	2550	10500	5500	13500	2150	6500	13500	3
S-13-1	950	1200	5000	2650	6500	1050	3000	6500	3
S-14-1	225	285	1150	600	1500	240	700	1500	3
S-15-1	1700	2150	8500	4600	11000	1800	5500	11000	3
S-16-1	1050	1350	5600	2950	7000	1150	3350	7000	15
S-17-1	145	185	750	395	950	155	465	950	3
S-18-1	1060	195	800	425	1050	165	485	1050	3
S-19-1	705	145	600	310	750	120	360	750	3
S-20-1	120	155	650	330	800	130	380	800	3
S-21-1	923	130	550	280	700	110	320	700	3
S-22-1	560	110	455	240	600	95	275	600	3
S-23-1	820	135	550	290	700	110	330	700	3
S-24-1	110	316	1230	300	750	2010	345	750	3
S-25-1	1350	1750	7000	3750	9000	1450	4300	9000	3
S-26-1	145	185	750	400	1000	155	460	1000	3
S-27-1	1750	2200	9000	4800	11500	1850	5500	11500	3
S-28-1	130	165	650	350	850	135	405	850	3
S-29-1	1160	210	850	460	1100	180	500	1100	3
S-30-1	1500	1900	7500	4050	10000	1600	4650	10000	3
S-1-2	950	1200	4900	2550	6500	1000	2300	6500	3.75
S-2-2	900	1150	4700	2450	6000	950	2250	6000	3.6
S-3-2	950	1200	4900	2550	6500	1000	2300	6500	3.75
S-4-2	950	1200	5000	2650	6500	1050	2350	6500	3.85
S-5-2	900	1150	4750	2500	6000	1000	2250	6000	3.65
S-6-2	1050	1350	5500	2900	7000	1150	2600	17900	4.25
S-7-2	950	1200	5000	2600	6500	1000	2350	6500	3.85
S-8-2	850	1100	4500	2350	5500	900	2150	5500	3.45
S-9-2	1050	1300	5500	2850	7000	1100	2550	7000	4.15
S-10-2	1000	1250	5000	2750	6500	1050	2450	6500	4
Min	100.0	110.0	455.0	240.0	600.0	95.0	275.0	600.0	3.0
Max	2000.0	2550.0	10500.0	5500.0	13500.0	2150.0	6500.0	17900.0	15.0
Mean	916.8	889.5	3631.7	1914.6	4652.6	794.9	2024.0	4932.1	4.0
STD	513.7	783.0	3196.9	1706.3	4119.8	684.9	1897.2	4622.3	2.7
n	39	39	39	39	39	39	39	39	39
UCL	1055.6	1101.0	4495.3	2375.5	5765.5	979.9	2536.5	6180.7	4.7
%DET	30	16	43	11	24	27	8	41	13

CONCENTRATION OF ORGANICS IN NEAR-PIER SAMPLES ONLY - MICROGRAMS/KILOGRAM

-DATA FROM VALIDATION REPORTS (APPENDIX N) WERE GIVEN PRIMACY.

-ETC LABORATORY REPORTS WERE CONSULTED FOR RESOLUTION OF BMDL VALUES.

-BMDL VALUES AND NON-DETECTS WERE ASSUMED TO BE EQUAL TO ONE-HALF THE SAMPLE QUANTITATION LIMIT.

	Phenol	Acenaphth.	BA	B(ghi)P	Dieth Ph	Naphth.	I(123)P	Di-n-BP	Toluene
S-7-1	792	140	600	305	750	120	350	750	8
S-8-1	160	200	800	430	1050	170	495	1050	3
S-9-1	1650	2100	8500	4600	11000	1800	5000	11000	3
S-10-1	2000	2500	10500	5500	13000	2100	6000	13000	3
S-11-1	1150	1500	6000	3200	8000	1250	3650	8000	3
S-12-1	2000	2550	10500	5500	13500	2150	6500	13500	3
S-13-1	950	1200	5000	2650	6500	1050	3000	6500	3
S-14-1	225	285	1150	600	1500	240	700	1500	3
S-15-1	1700	2150	8500	4600	11000	1800	5500	11000	3
S-16-1	1050	1350	5600	2950	7000	1150	3350	7000	15
S-23-1	820	135	550	290	700	110	330	700	3
S-24-1	110	316	1230	300	750	2010	345	750	3
S-25-1	1350	1750	7000	3750	9000	1450	4300	9000	3
S-26-1	145	185	750	400	1000	155	460	1000	3
S-27-1	1750	2200	9000	4800	11500	1850	5500	11500	3
S-28-1	130	165	650	350	850	135	405	850	3
S-29-1	1160	210	850	460	1100	180	500	1100	3
S-30-1	1500	1900	7500	4050	10000	1600	4650	10000	3
S-1-2	950	1200	4900	2550	6500	1000	2300	6500	3.75
S-2-2	900	1150	4700	2450	6000	950	2250	6000	3.6
S-3-2	950	1200	4900	2550	6500	1000	2300	6500	3.75
S-4-2	950	1200	5000	2650	6500	1050	2350	6500	3.85
S-5-2	900	1150	4750	2500	6000	1000	2250	6000	3.65
S-6-2	1050	1350	5500	2900	7000	1150	2600	17900	4.25
S-7-2	950	1200	5000	2600	6500	1000	2350	6500	3.85
S-8-2	850	1100	4500	2350	5500	900	2150	5500	3.45
S-9-2	1050	1300	5500	2850	7000	1100	2550	7000	4.15
S-10-2	1000	1250	5000	2750	6500	1050	2450	6500	4
Min	110.0	135.0	550.0	290.0	700.0	110.0	330.0	700.0	3.0
Max	2000.0	2550.0	10500.0	5500.0	13500.0	2150.0	6500.0	17900.0	15.0
Mean	1006.9	1176.3	4801.1	2531.6	6150.0	1054.3	2663.8	6539.3	3.9
STD	531.2	748.4	3057.9	1642.0	3954.0	642.3	1886.4	4534.7	2.4
n	28	28	28	28	28	28	28	28	28
UCL	1177.8	1417.1	5785.2	3060.1	7422.5	1261.0	3270.9	7998.7	4.7

CONCENTRATION OF ORGANICS IN SEDIMENT - LAKE CALUMET (Mg/kg = micrograms per kilogram)

--DATA FROM VALIDATION REPORTS (APPENDIX N) WERE GIVEN PRIMACY.

--ETC LABORATORY REPORTS WERE CONSULTED FOR RESOLUTION OF BMDL VALUES.

--BMDL VALUES AND NON-DETECTS WERE ASSUMED TO BE EQUAL TO ONE-HALF THE SAMPLE QUANTITATION LIMIT.

	Phenol	Acenaphth.	BA	B(ghi)P	Dieth Ph	Naphth.	I(123)P	Di-n-BP	Toluene
S-1-1	881	200	800	430	1050	170	495	1050	3
S-2-1	1160	180	750	390	950	150	445	950	3
S-3-1	1070	175	700	380	950	150	435	950	15
S-4-1	100	125	500	270	650	105	305	650	3
S-5-1	840	155	650	335	800	130	385	800	3
S-17-1	145	185	750	395	950	155	465	950	3
S-18-1	1060	195	800	425	1050	165	485	1050	3
S-19-1	705	145	600	310	750	120	360	750	3
S-20-1	120	155	650	330	800	130	380	800	3
S-21-1	923	130	550	280	700	110	320	700	3
S-22-1	560	110	455	240	600	95	275	600	3
Min	100.0	110.0	455.0	240.0	600.0	95.0	275.0	600.0	3.0
Max	1160.0	200.0	800.0	430.0	1050.0	170.0	495.0	1050.0	15.0
Mean	687.6	159.5	655.0	344.1	840.9	134.5	395.5	840.9	4.1
STD	400.3	30.0	118.4	64.6	157.8	25.2	75.3	157.8	3.6
n	11	11	11	11	11	11	11	11	11
UCL	906.3	175.9	719.7	379.4	927.1	148.3	436.6	927.1	6.1

CONTAMINANTS IN CLAY, PHASE II DATA ONLY, CWMCS CHICAGO INCINERATOR FACILITY

- DATA FROM VALIDATION REPORTS (APPENDIX X) WERE GIVEN PRIMACY.
- ETC ORIGINAL LABORATORY REPORTS WERE CONSULTED FOR RESOLUTION OF BMDL VALUES.
- BMDL VALUES WERE ASSUMED TO BE EQUAL TO ONE-HALF THE SAMPLE QUANTITATION LIMIT.
- NON-DETECTS EQUAL TO ONE-HALT THE SQL (Mg/kg = micrograms per kilogram)

Sample	Antimony	Arsenic	Beryllium	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Silver	Zinc	BEHP	Phenan.	Di-n-BP	Benzene	Toluene
C-4-5	3650	8500	690	3100	18000	21000	10000	49	25000	600	45000	41500	330	6910	1.2	3.3
C-4-15	3750	16000	380	3400	8600	42000	24000	50	29000	600	50000	650	340	4090	2.9	8.72
C-4-40	3350	11000	630	3400	15000	29000	31000	44.5	31000	550	59000	550	345	4460	2.42	4.1
C-6-5	3700	9600	660	3300	17000	32000	16000	49	34000	600	63000	550	295	4660	2.64	3.6
C-6-15	3500	16000	410	3700	8600	46000	23000	47	28000	600	81000	600	320	2840	2.64	3.6
C-6-40	3300	11000	570	3400	14000	34000	16000	44	30000	550	55000	550	295	2020	2.42	3.3
C-2-5	3550	6700	670	2900	17000	26000	13000	47.5	29000	600	54000	4810	320	6080	2.64	3.6
C-2-15	3600	15000	440	3500	9300	50000	20000	48	32000	600	90000	9410	429	6580	2.64	3.6
C-1-5	3650	8000	740	1400	18000	27000	14000	48.5	30000	600	48000	3870	325	2620	2.64	3.6
C-1-15	3850	2900	870	1500	23000	25000	13000	50	35000	650	56000	7690	350	4350	2.86	3.9
C-1-40	3450	11000	580	1900	14000	40000	21000	46	31000	600	79000	7750	310	3070	2.42	3.3
C-7-15	3550	12000	580	1800	16000	40000	24000	47.5	37000	600	66000	10800	320	4250	2.64	3.6
C-7-40	3350	8900	720	1800	17000	29000	21000	44.5	30000	550	61000	7600	300	8240	2.64	3.6
C-3-5	3600	9800	740	1800	17000	49000	23000	48	41000	600	58000	6140	320	9540	2.42	3.3
C-3-15	3500	13000	740	2000	17000	42000	24000	47	40000	600	100000	7370	315	1900	2.64	3.6
C-3-40	3300	9400	560	1800	13000	38000	21000	44	32000	550	64000	3870	295	17600	2.64	3.6
C-7-5	3650	8200	730	1900	18000	27000	16000	48.5	31000	600	56000	11000	330	3970	2.42	3.3
C-5-5	3600	5100	760	1500	19000	23000	13000	100	27000	600	48000	6640	320	3980	2.64	3.6
C-5-15	3550	18000	610	2000	11000	44000	22000	47.5	34000	600	64000	4120	320	8510	2.64	3.6
C-5-40	3350	10000	580	1900	14000	34000	20000	44.5	31000	550	80000	4450	300	15200	2.64	3.6
C-2R-5	3650	5800	690	2800	18000	23000	14000	48.5	28000	600	46000	512	155	4300	2.64	3.6
C-2R-15	3800	13000	350	2900	7700	37000	21000	50	23000	650	53000	512	272	2690	3.08	4.2
C-2R-40	3400	11000	460	7100	10000	36000	49000	45	41000	550	53000	337	264	5810	24.4	33.3
Min	3300.0	2900.0	350.0	1400.0	7700.0	21000.0	10000.0	44.0	23000.0	550.0	45000.0	337.0	155.0	1900.0	1.2	3.3
Max	3850.0	18000.0	870.0	7100.0	23000.0	50000.0	49000.0	100.0	41000.0	650.0	100000.0	41500.0	429.0	17600.0	24.4	33.3
Mean	3550.0	10430.4	615.7	2643.5	14791.3	34521.7	20391.3	49.5	31695.7	591.3	62130.4	6142.7	311.7	5811.7	3.5	5.1
STD	157.4	3673.9	135.6	1238.0	3998.3	8675.3	7975.8	11.2	4704.3	28.8	14586.1	8490.3	46.7	3941.2	4.6	6.2
n	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23
UCL	3606.2	11741.9	664.1	3085.4	16218.6	37618.6	23238.5	53.5	33375.0	601.6	67337.3	9173.5	328.4	7218.7	5.1	7.3
%DET	96	100	100	100	100	100	100	52	100	35	100	100	39	100	9	13

CONCENTRATION OF CONTAMINANTS IN SURFACE WATER - Phase I and II Results (Mg/L = micrograms per liter) SITE WIDE

- DATA FROM VALIDATION REPORTS (APPENDIX X) WERE GIVEN PRIMACY.
- ETC ORIGINAL LABORATORY REPORTS WERE CONSULTED FOR RESOLUTION OF BMDL VALUES.
- BMDL VALUES WERE ASSUMED TO BE EQUAL TO ONE-HALF THE SAMPLE QUANTITATION LIMIT.
- NON-DETECTS EQUAL TO ONE-HALT THE SQL (Mg/kg = micrograms per kilogram)

	<u>Toluene</u>
SW-1-1	3
SW-2-1	3
SW-3-1	3
SW-4-1	3
SW-5-1	3
SW-1-2	2.5
SW-2-2	3
SW-3-2	3
SW-4-2	3
SW-5-2	3
SW-6-2	3
SW-7-2	3
SW-8-2	3
SW-9-2	2.5
SW-10-2	2.5
SW-11-2	3
SW-12-2	3
SW-13-2	3
SW-14-2	3
SW-15-2	3
Min	2.5
Max	3.0
Mean	2.9
STD	0.2
n	20
UCL	3.0
%DET	15

## **APPENDIX B**



## APPENDIX B

**TABLE 1**  
**TOXICITY OF TOLUENE TO PELAGIC AQUATIC RECEPTORS**

Species	96-Hour LC <sub>50</sub> Concentration (µg/L)	MATC (µg/L)	Reference for LC <sub>50</sub>
<b>SALMONIDS</b>			
Rainbow trout ( <i>Onchorhynchus kisutch</i> )	2700	145 <sup>a</sup>	Etnier <i>et al.</i> , 1987
<b>CENTRARCHIDS</b>			
Bluegill ( <i>Lepomis macrochirus</i> )	12,700	760 <sup>a</sup>	Etnier <i>et al.</i> , 1987
Bluegill ( <i>Lepomis macrochirus</i> )	24,000	1503 <sup>a</sup>	USEPA, 1980e
<b>CYPRINIDS</b>			
Fathead minnow ( <i>Pimephales promelas</i> )	34,270	2200 <sup>a</sup>	USEPA, 1980e
Fathead minnow ( <i>Pimephales promelas</i> )	42,330	2757 <sup>a</sup>	USEPA, 1980e
Goldfish ( <i>Carassius auratus</i> )	22,800	1422 <sup>a</sup>	USEPA, 1980e
Goldfish ( <i>Carassius auratus</i> )	57,680	3840 <sup>a</sup>	USEPA, 1980e
<b>WATER COLUMN INVERTEBRATES</b>			
Cladoceran ( <i>Daphnia magna</i> )	310,000	62,433 <sup>b</sup>	Etnier <i>et al.</i> , 1987
Cladoceran ( <i>Daphnia magna</i> )	60,000	10,087 <sup>b</sup>	USEPA, 1980e

<sup>a</sup> Calculated using Equation 5-2.

<sup>b</sup> Calculated using Equation 5-3.

## APPENDIX B

**TABLE 2**  
**TOXICOLOGICAL DATA FOR PAHs OF POTENTIAL CONCERN**  
**USED TO GENERATE MATCs FOR BOTTOM-DWELLING AQUATIC RECEPTORS**

Chemical	LC <sub>50</sub> ( $\mu$ g/L)	Test Species	MATC ( $\mu$ g/L) <sup>a</sup>	Reference for LC <sub>50</sub>
Fluorene	1000	Sandworm (benthic invertebrate)	107	Eisler, 1987a
Fluorene	5600	Snail (benthic invertebrate)	725	Eisler, 1987a
Naphthalene	2810	Midge (benthic invertebrate)	337	USEPA, 1986b
Naphthalene	3800	Sandworm (benthic invertebrate)	472	Eisler, 1987a
Phenanthrene	490	Midge (benthic invertebrate)	48.5	USEPA, 1987
Phenanthrene	600	Sandworm (benthic invertebrate)	61	Eisler, 1987a
Benzo(a)pyrene	1000	Sandworm (benthic invertebrate)	107	Eisler, 1987a
Chrysene	1000	Sandworm (benthic invertebrate)	107	Eisler, 1987a
Dibenzo(a,h)anthracene	1000	Sandworm (benthic invertebrate)	107	Eisler, 1987a
Fluoranthene	500	Sandworm (benthic invertebrate)	49.6	Eisler, 1987a
MEAN MATC			212	

<sup>a</sup> Calculated using Equation 5-3.

## APPENDIX B

**TABLE 3**  
**TOXICITY OF PHTHALATE ESTERS TO BOTTOM DWELLING AQUATIC RECEPTORS**

Species	LC <sub>50</sub> Concentration (µg/L)	MATC (µg/L)	Reference for LC <sub>50</sub>
<b>ICTALURIDS</b>			
Channel catfish ( <i>Ictalurus punctatus</i> )	2910	157 <sup>a</sup>	Mayer and Sanders, 1973 (cited in USEPA, 1980f)
<b>BENTHIC INVERTEBRATES</b>			
Crayfish ( <i>Orconectes nais</i> )	10,000	1380 <sup>b</sup>	Sanders <i>et al.</i> , 1973 (cited in USEPA, 1981a)
Midge ( <i>Chironomous plumosus</i> )	4000	499 <sup>b</sup>	Streufert, 1977 (cited in USEPA, 1980f)

<sup>a</sup> Calculated using Equation 5-2.

<sup>b</sup> Calculated using Equation 5-3.

## APPENDIX B

**TABLE 4**  
**TOXICITY OF METHYLENE CHLORIDE TO PELAGIC AQUATIC RECEPTORS**

Species	96-Hour LC <sub>50</sub> Concentration (µg/L)	MATC (µg/L) <sup>a</sup>	Reference for LC <sub>50</sub>
<b>CENTRARCHIDS</b>			
Bluegill ( <i>Lepomis macrochirus</i> )	220,000	16,084	Etnier <i>et al.</i> , 1987
<b>CYPRINIDS</b>			
Fathead minnow ( <i>Pimephales promelas</i> )	310,000	23,214	Etnier <i>et al.</i> , 1987
Fathead minnow ( <i>Pimephales promelas</i> )	193,000	13,981	Etnier <i>et al.</i> , 1987

<sup>a</sup> Calculated using Equation 5-2.

## APPENDIX B

**TABLE 5**  
**TOXICITY OF MERCURY TO BOTTOM DWELLING AQUATIC RECEPTORS**

Species	96-Hour LC <sub>50</sub> Concentration (µg/L)	MATC (µg/L)	Reference for LC <sub>50</sub>
<b>ICTALURIDS</b>			
White sucker ( <i>Catostomus commersoni</i> )	687 mercuric chloride	23.5 <sup>a</sup>	Etnier <i>et al.</i> , 1987
<b>BENTHIC INVERTEBRATES</b>			
Crayfish ( <i>Orconectes limosas</i> )	50 mercuric chloride	6.1 <sup>b</sup>	USEPA, 1980g
Bristleworm ( <i>Nais sp.</i> )	1000 mercuric nitrate	63.1 <sup>b</sup>	USEPA, 1980g
Worm ( <i>Lumbricus variegatus</i> )	100 mercuric chloride	6.9 <sup>b</sup>	Etnier <i>et al.</i> , 1987
Midge ( <i>Chironomous sp.</i> )	1800 48-hr; mercuric chloride	111 <sup>b</sup>	Etnier <i>et al.</i> , 1987
Snail ( <i>Amnicola sp.</i> )	2100 inorganic Hg	129 <sup>b</sup>	USEPA, 1981c
Sludgeworm ( <i>Tubifex tubifex</i> )	3200 48-hr; mercuric chloride	193 <sup>b</sup>	Etnier <i>et al.</i> , 1987

<sup>a</sup> Calculated using Equation 5-5.

<sup>b</sup> Calculated using Equation 5-4.

## APPENDIX B

**TABLE 6**  
**TOXICITY OF ZINC TO BOTTOM DWELLING AQUATIC RECEPTORS**

Species	LC <sub>50</sub> Concentration (µg/L)	MATC (µg/L)	Reference for LC <sub>50</sub>
<b>ICTALURIDS</b>			
White sucker ( <i>Catostomus commersoni</i> )	2200 zinc chloride	55 <sup>a</sup>	Etnier <i>et al.</i> , 1987
<b>BENTHIC INVERTEBRATES</b>			
Midge ( <i>Chironomous sp.</i> )	18,200 hardness = 50	1023 <sup>b</sup>	Rehwoldt <i>et al.</i> , 1973 (cited in USEPA, 1980c)
Midge ( <i>Chironomous sp.</i> )	80,000 zinc chloride	4236 <sup>b</sup>	Etnier <i>et al.</i> , 1987
Snail ( <i>Physa heterostropha</i> )	600 - 4400 zinc chloride; hardness = 41 - 178	38.6 <sup>b</sup>	Cairns and Scheier, 1978 (cited in USEPA, 1980c)
Tubificid	130,000 zinc chloride	6751 <sup>b</sup>	Etnier <i>et al.</i> , 1987
Worm ( <i>Nais sp.</i> )	18,400 hardness = 50	1033 <sup>b</sup>	Rehwoldt <i>et al.</i> , 1973 (cited in USEPA, 1980c)

<sup>a</sup> Calculated using Equation 5-5.

<sup>b</sup> Calculated using Equation 5-4.

## APPENDIX B

**TABLE 7**  
**TOXICITY OF CADMIUM TO BOTTOM DWELLING AQUATIC RECEPTORS**

Species	96-Hour LC <sub>50</sub> Concentration (µg/L)	MATC (µg/L)	Reference for LC <sub>50</sub>
<b>ICTALURIDS</b>			
Channel Catfish (eggs and fry) ( <i>Ictalurus punctatus</i> )	11 (MATC; 30-60 day exposure)	11	Sauter <i>et al.</i> , 1976 (cited in Etnier <i>et al.</i> , 1987)
Channel Catfish ( <i>Ictalurus punctatus</i> )	7940 cadmium chloride; hardness = 55	140 <sup>a</sup>	Spehar and Carlson, 1984; (cited in USEPA, 1985a)
Channel Catfish ( <i>Ictalurus punctatus</i> )	4480	92.4 <sup>a</sup>	Etnier <i>et al.</i> , 1987
White sucker ( <i>Catostomus commersoni</i> )	1110 cadmium chloride; hardness = 18	33.4 <sup>a</sup>	Duncan and Klaverkamp, 1983 (cited in USEPA, 1985a)
<b>BENTHIC INVERTEBRATES</b>			
Midge ( <i>Chironomus sp.</i> )	1200 hardness = 50	75.2 <sup>b</sup>	Rehwoldt <i>et al.</i> , 1973 (cited in USEPA, 1985a)
Crayfish ( <i>Oronectes limnosus</i> )	400 cadmium chloride	26.2 <sup>b</sup>	Boutet and Chalsemartin, 1973 (cited in USEPA, 1985a)
Worm ( <i>Nais sp.</i> )	1700 cadmium sulfate; hardness = 50	105 <sup>b</sup>	Rehwoldt <i>et al.</i> , 1973 (cited in USEPA, 1985a)
Snail embryo ( <i>amnicola sp.</i> )	3800 hardness = 50	227 <sup>b</sup>	Rehwoldt <i>et al.</i> , 1973 (cited in USEPA, 1985a)
Snail immature ( <i>Physa gyrina</i> )	400 hardness = 200	26.2 <sup>b</sup>	Wier and Walter, 1976 (cited in USEPA, 1985a)
Snail ( <i>Apelka hypernorum</i> )	93 cadmium chloride; hardness = 45	6.5 <sup>b</sup>	Holcombe <i>et al.</i> , 1984 (cited in USEPA, 1985a)
<b>OVERALL MEAN</b>		74.3	

<sup>a</sup> Calculated using Equation 5-4.

<sup>b</sup> Calculated using Equation 5-5.

# APPENDIX B

TABLE 8  
TOXICITY OF COPPER TO BOTTOM DWELLING AQUATIC RECEPTORS

Species	LC <sub>50</sub> Concentration <sup>a</sup> (µg/L)	MATC (µg/L)	Reference for LC <sub>50</sub>
<b>ICTALURIDS</b>			
Channel catfish ( <i>Ictalurus punctatus</i> )	1200	35.3 <sup>a</sup>	Etnier <i>et al.</i> , 1987
Brown bullhead ( <i>Ictalurus nebulosus</i> )	540 copper sulfate; hardness = 200	19.7 <sup>a</sup>	Geckler <i>et al.</i> , 1976 (cited in USEPA, 1985b)
Brown bullhead ( <i>Ictalurus nebulosus</i> )	170 copper sulfate; hardness = 202	8.5 <sup>a</sup>	Brungs <i>et al.</i> , 1973 (cited in USEPA, 1985b)
<b>BENTHIC INVERTEBRATES</b>			
Snail ( <i>Goniobasis livenscens</i> )	390 copper sulfate; hardness = 154	25.6 <sup>b</sup>	Paulson <i>et al.</i> , 1983 (cited in USEPA, 1985b)
Snail ( <i>Physa heterostrophia</i> )	108 copper sulfate; hardness = 100	7.5 <sup>b</sup>	Wurtz and Bridges, 1961 (cited in USEPA, 1985b)
Snail embryo ( <i>Amnicola sp.</i> )	900 copper sulfate; hardness = 100	57 <sup>b</sup>	Rehwooldt <i>et al.</i> , 1973 (cited in USEPA, 1985b)
Tubificid worm ( <i>Limnodrilus hoffmeisteri</i> )	102 copper sulfate; hardness = 100	7.1 <sup>b</sup>	Wurtz and Bridges, 1961 (cited in USEPA, 1985b)
Worm ( <i>Nais sp.</i> )	90 copper sulfate; hardness = 50	6.3 <sup>b</sup>	Rehwooldt <i>et al.</i> , 1973 (cited in USEPA, 1985b)
Crayfish ( <i>Orconectes limosus</i> )	600 copper chloride	38.6 <sup>b</sup>	Boutet and Chaisemartin, 1973 (cited in USEPA, 1985b)
Crayfish larva ( <i>Procambarus clarkii</i> )	720 hardness = 17	46 <sup>b</sup>	Rice and Harrison, 1983 (cited in USEPA, 1985b)
Midge 1st instar ( <i>Chironomus tentans</i> )	298 copper chloride; hardness = 71	19.7 <sup>b</sup>	Nebeker <i>et al.</i> , 1984 (cited in USEPA, 1985b)
Midge ( <i>Chironomus sp.</i> )	30 copper sulfate; hardness = 50	2.2 <sup>b</sup>	Rehwooldt <i>et al.</i> , 1973 (cited in USEPA, 1985b)
OVERALL MEAN		22.8	

<sup>a</sup> Calculated using Equation 5-4.

<sup>b</sup> Calculated using Equation 5-5.